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Including the Railroad Gazette and the Railway Age

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GENERAL NEWS SECTION.....

THE Master Car Builders' Association is taking a special letter ballot on two proposed changes in the Rules of Interchange, both of which, if made, would, it is believed, promote the freer movement of traffic at interchange points, and have a material tendency to minimize congestion at these vital points during the period of heavy traffic this fall. The first proposition is to abrogate the rules penalizing the delivering line for certain defects in cars which, under the present rules, become delivering line defects when cars are offered in interchange. The second is for the addition of 10 per cent to the present M. C. B. repair allowances for labor and material charges. Both are submitted to the members with the recommendation of the arbitration committee that they be adopted,

and with the approval of the executive committee. An argument in favor of the first proposition is that it has been found that approximately half of the present carding is for owner's defects for which the car had been carded already, and that the proposed change would obviate the delay to traffic now caused by carding, which does not in any way promote car maintenance. The second proposed change is intended to overcome the present reluctance to repair cars promptly, which is due to the fact that under existing allowances for repairs the repairing road is virtually penalized. The allowances contain no provision for the cost of facilities and tools; and the cost of labor and materials have both increased in recent years since the present allowances were adopted. To increase the allowances so as to enable the repairing road to break even, or even to make a slight profit, would undoubtedly reduce or eliminate the reluctance to make repairs, and should have a direct effect in reducing the proportion of bad order cars. To seek to apply remedies for delays at interchange points is to attack the problem of congestion at its very heart, and the measures so strongly recommended should have an especial appeal at this time.

DURING the eight months of the present calendar year from January 1 to August 30, the *Railway Age Gazette* reported in its news columns the placing of orders for 94,985 freight cars, 1,475 passenger cars and 2,720 locomotives. The orders during the same period of 1911 were for 41,426 freight cars, 1,436 passenger cars, 1,477 locomotives. For the entire calendar year 1911 the total orders, as compiled for our annual statistical number of December 29, amounted to 133,117 freight cars, 2,623 passenger cars and 2,850 locomotives. With two-thirds of the year gone, therefore, the total number of freight car orders reported thus far in 1912 exceeds by about 6,000 two-thirds of the orders placed last year, and is over twice the number ordered in eight months of 1911. In the case of passenger cars the number falls slightly short of a corresponding proportion of last year's orders. The orders for locomotives in eight months of 1912 are only 130 less than in all of last year. Furthermore, our current reports are not as complete as our annual reports of equipment orders; therefore the orders during the last eight months have been larger in proportion than the figures given here indicate. In our issue of May 17 it was shown that orders were placed in the first four months of the year for 62,464 freight cars, 1,076 passenger cars and 1,476 locomotives. It is evident, therefore, that the amount of equipment purchased during the last four months has fallen considerably below the mark set in the earlier part of the year. However, because a very large proportion of the 1911 equipment orders were placed during the last two or three months of that year, this year's orders are running very far ahead of those in the period of 1911 with which they should be compared, and, especially in the case of locomotives, indicate a strong effort on the part of the railways to prepare themselves for handling the large volume of traffic expected this fall. The failure of orders in the past four months to keep pace with the record set in January, February, March and April is probably due to the fact that the rush of orders in the six months beginning about November 1, 1911, so filled the equipment plants with business that many manufacturers were unable to handle any great amount of new business during the summer months. After the heavy tax on all of the facilities of the railways which the bumper crops of the West are expected to impose this fall, and following the consequent increase in the earnings of the roads, it is only reasonable to expect another large increase in orders which will make the number in the latter part of this year equal the number placed in the latter months of 1911. If this should prove to be the case the calendar year 1912 will stand out very prominently in this respect in comparison with the preceding five years. Freight car orders thus far this year have been at the rate of 142,500 for the year, while the average for the past five years

has been 135,000. Locomotive orders have been at the rate of 4,080 a year, while the average orders during the past five years have been only 2,930.

THREE has been more or less agitation for a uniform classification of freight ever since the original Act to Regulate Commerce went into effect. It was revived when the Hepburn Act was passed, and soon afterward the railways began making a serious effort to comply with the demand for uniformity, which came from both the commission and the shippers, but chiefly the former. Over five years ago (May 10, 1907) *The Railway Age* criticized the movement on the ground that conditions in the United States were not uniform and that, therefore, to apply a single classification to them would do more harm than good. It has since been predicted in these columns more than once that if the movement were unsuccessful it would be because of opposition from shippers, not from railways, because the interests of the railways could be protected by raising the classifications of some commodities in each territory and lowering those of others. The interests of shippers could not be similarly protected. Each shipper usually handles only one commodity or a related group of commodities. Those whose rates were reduced by the reclassification would regard the matter philosophically, but those who suffered from the offsetting raises in classification and rates would be inconsolable and irreconcilable. Developments within recent months have verified these anticipations regarding the attitude of shippers. The changes proposed last Fall and Spring have related only to descriptions of articles, rules and minimum weights; but the shippers adversely affected protested so strongly that the Interstate Commerce Commission suspended all the tariffs prepared in the interest of uniformity. As to the desirability of a uniform classification, we published an article by Prof. W. Z. Ripley, of Harvard, last week, in which a negative conclusion was reached. Prof. Ripley supported his view with data and arguments which are very convincing. He believes now, as we contended five years ago, that while uniformity ought to be steadily worked toward, the conditions of the country are still so varied that a uniform classification could not be adopted or even approximated to under present conditions without causing more harm to those it would hurt than benefit to those it would help. The early attainment of uniformity of descriptions and rules probably is both practicable and desirable; the adoption of uniform minimum weights may be practicable, but is undesirable; the adoption of uniform ratings is both impracticable and undesirable. Classification and rates should be adapted to the actual conditions, not the conditions to the classification and rates. There is a natural tendency for transportation and commercial conditions to become more nearly uniform, and, therefore, as Prof. Ripley says, there should be constant pressure to make rates and classifications more uniform. This would be evolution; uniform classification at present would be revolution.

DEFICIENT AND UNFAIR GOVERNMENT REPORTS ON ACCIDENTS.

THE reports of the government inspector on the collisions at Corning, N. Y., on July 4 and at Western Springs, Ill., on July 14, bring out in strong light certain glaring faults that have been observed in a good many of these reports, and it is time that they were properly characterized. Some of these faults were touched on briefly in an editorial in our issue of May 3, last, in connection with the Kinmundy collision. The reports deserve serious attention, for the Interstate Commerce Commission, in publishing them, gives them a quasi-approval. That a body containing five experienced lawyers, men accustomed to drawing out and weighing evidence, can really approve some of the chief inspector's deliverances, is hardly believable.

It is true that the later reports have in some respects improved on the earlier ones. It is also true that bits of sound wisdom have been sprinkled liberally through the whole list. Most of these, however, have been truths well known to railway men already. That steel cars have saved many lives which would

have been sacrificed if the same disasters had occurred to wooden ones has been fully set forth. In showing up the numerous cases where employees did not know the rules, and had not been instructed, or even questioned; had not been required to carry a watch or to know important details of their duties, the investigators have brought out presumptive evidence that the reports made by the railways, which were the basis of the accident reports published in the quarterly bulletins before the inspectors began their duties, must often have been far from full and complete. In declaring the block system necessary, in some cases, the writer of the reports has set forth sound doctrine; but as he has done this in a superficial manner, decidedly in contrast to the former declarations of the commission itself, and of the Block Signal Board, on the same subject, his words can have little weight. The frequent declaration that disregard of the block signals by enginemen is only a "contributory" cause of a collision, something else being the main cause, gives evidence of loose notions as to what the block system really is.

This superficiality, indeed, annoys the reader at every turn. The recommendation that automatic train stops be used where discipline, seemingly good, has failed to make enginemen properly vigilant, may be said, perhaps, to embody a suggestion which points in the right direction. But where a subject bristles with difficulties at every turn, as this one does, the government report which turns it off in a single paragraph would only expose its author to ridicule were it not for the serious results to which such handling of a serious subject may lead. And those critics who say that there is a worse fault in the reports than superficiality call attention to some striking features. In short, those who believe that labor-union sympathies warp them, and warp them badly, have no difficulty in pointing to many features tending to support their belief. The two reports which we have referred to are not the only ones.

It is admitted that the engineman who was at fault at Corning had been drinking and had not taken full normal rest, disobeying the spirit and probably also the letter of an important rule. But the government report has for him no word of censure. There are 13 lines summarizing the evidence, and 9 lines about Engineman Schroeder's record; and it is stated that his failure to observe and be governed by the automatic block signal indications, as well as the signals given by a flagman, was the cause of the collision. That is all. There was evidence that Schroeder had been under the influence of liquor, and he admitted that he had taken two drinks of gin prior to 11 p. m., yet the question of his mental condition when he was on the engine is not discussed. This is one of the most startling collisions that have occurred for several years. To find that an engineman of 40 years' railway experience, and having a good record extending over 23 years, had such an imperfect conception of his duty in the matter of keeping his brain clear, calls for searching inquiry. In a system of discipline of which the outward results apparently had been so good, how could there be such a serious loop-hole? Was Schroeder's good record based in part on fallacious grounds? Were the subordinate officers responsible for the discipline of the engineman at fault in any respect? What is the morale of the enginemen generally? If the government is to give to the public any useful information as to the best means of preventing such errors as Schroeder's, it must take up and consider these questions.

It is agreed on all hands that the engineman's failure was the main cause of this collision. Such neglect as his should be treated as the primary feature to be investigated; but instead of doing this the inspector devotes 31 lines to the matter of block signals and automatic stops, a half page to the question of torpedoes and three quarters of a page to the flagging rule, his observations on these subjects being a mixture of good, bad and indifferent suggestions. The failure of Flagman Lane is called a contributing cause; but in the case of the Western Springs collision which in its most essential features comes under the same head as that at Corning, the flagman is charged with the principal blame, and the engineman's failure is made secondary. What reason can be found for this opposite treatment? In the

Corning report the use of automatic train stops is declared to be "urgently demanded"; in the Western Springs report automatic stops are passed over in silence. The automatic block signals at Corning are of modern approved electric type, and the system extends over the whole of the main line of the Lackawanna from Hoboken to Buffalo. The fundamental features of this system are the same as those of the signals in use on a large number of the best roads in the country; but the inspector goes on to recommend that trains should be kept two block sections apart, a radical modification which has found but little favor among experts except on the electric roads using automatic stops; and he ends by holding that, apparently even with the overlap, trains should run at low speed during fogs unless automatic stops are installed.

If there is any question concerning this collision which is of serious and vital interest to railway officers it is that concerning the most effective means of preventing such derelictions as Schroeder's. Competent investigation of the case ought to deal with this question as fully as possible; and, as has been suggested, those critics who hold that the investigation in this case was weak and worthless, because of the friendly feeling of one labor union man for another, are entitled to an answer.

In the Western Springs case, as has been stated, the primary responsibility was thrown on Flagman Woodworth. Half a page is given to his case, though all we have about his record is the brief sentence that "it was good"; and questions as to the actual details of his service and of the discipline of flagmen generally are left untouched. If his was the main fault in the case, a reasonably comprehensive inquiry demands that attention be given to the same features which we have mentioned in connection with the case of Engineman Schroeder. But if, as all competent judges are agreed, the space interval system is by far the simplest means of preventing collisions, and the only method which has given proof of its soundness by a high degree of safety under the most adverse conditions, the main fault was not the flagman's; it was that of Engineman Brownson of train No. 8. In this case there is no question of liquor drinking, but there was the same glaring disregard of the simple rule, that stop signals *must be seen*, fog or no fog. Moreover, the same error was committed by three enginemen on the same morning; and the report says that running past stop signals is a not uncommon occurrence. These facts call for as thorough an investigation of discipline as is called for in the Corning case; and the need might perhaps be called more urgent, as there ought to be more facts available. The investigation of men's drinking habits, when they are off duty, involves many delicate details on which there might be a difference of opinion, and some questions have to remain unanswered; but where enginemen of fast trains habitually disregard positive stop signals there must be considerable knowledge on the subject that could be brought to light if the proper measures were taken.

Instead of inquiring into this subject, the inspector goes into a discussion of considerable length as to the danger of high speeds and as to the correctness of the opinions expressed by an officer of the Burlington road in regard to the percentage of train disasters which are due to high speed. As the "limit of safety" is discussed in regard to its bearing on derailments and on collisions, all in the same breath, this part of the report is confusing, and as the conclusions are quite vague we shall not further discuss it. It may be observed in passing, however, that in considering the question of speed per se it is important—whether one is dealing with derailments, where a main factor is the track, or with collisions, where a main factor is the signaling—to take cognizance of the actual situation on many hundreds of miles of railway both in England and America; to look at the trains which are run at the highest speeds every day, and with high frequency throughout the day, between New York and Philadelphia; at similar trains between numerous English cities; at high speed traffic, scarcely less intense, between New York and Chicago, and on a number of lines west of Chicago, and in many instances elsewhere. The operation of all these trains is subject

to adverse conditions as difficult to deal with as any of the situations which have been referred to in the government reports; and yet under these conditions high records for safety have been made. The speed which can be safely made depends on the special conditions of track and equipment; and, given physical conditions under which high speed normally has been made with safety, if a collision occurs it is illogical to conclude that the accident was due to the speed.

As was indicated at the outset, this discussion was taken up because of the remarkably unbalanced character of these accident reports, and of the query, made by many railway officers, as to the reason why they are so one-sided. The absence from them of needed information is obvious, whatever its cause. A government investigation must be impartial as between the railway, the employee, the public, the rail-maker and whomsoever is involved, or it is worthless; that is elementary; but to be of constructive value it must be much more than that. It must go to the bottom of its subject. If it does not get down to the "cause of causes" and throw light on it and how it may be removed, it is of no more value than the incomplete or prejudiced reports, from coroners and other ignorant or ill-informed sources, with which the public had to be content before the federal government took hold of the job of investigation.

SOUND RAIL INGOTS.

THE paper on "How to Secure Soundness in Steel Rails" by Robert W. Hunt, which appears on another page of this issue, will command serious attention. Its author speaks with special authority on this subject because of his long and active study of the rail question. He strikes at the heart of the rail problem by going directly to the ingot. Much prominence has been given to discussions of the chemical composition of rails by the president of the steel corporation and others, which has tended to obscure the real cause of the present trouble with rails. Important as the chemical composition is, it is entirely overshadowed in importance by the methods of manufacture. Much attention has been given to the carbon content, but the extensive experience of the Harriman lines and others with carbon ranging considerably above that recommended by the manufacturers and used by many roads, tends to show that sound rails can be secured as well with high carbon as with low.

Students of the rail question are gradually coming to realize that the quality of the rail depends very greatly on the character of the ingot, and that each individual ingot may have characteristics differing widely from those of others in the same heat. The present specifications do not take this fact into consideration to any extent. Several years ago the specifications required that one test be made from each fifth heat. In 1904 the American Railway Engineering Association specifications increased the tests to one in every heat, and the specifications adopted by this association last March and enforced by several roads for this year's rolling, require three tests from each heat of open hearth steel and one from each heat of Bessemer steel. Each heat of Bessemer steel contains four or five ingots, while a heat of open hearth steel averages about 29 ingots. In the meantime, the proportion of open hearth steel used has greatly increased, so that the number of tests has not increased as much as might be inferred from the provisions of the specifications.

Many railway engineers believe, with Captain Hunt, that a true indication of the character of the steel can be secured only by testing each ingot. The manufacturers have constantly opposed increasing the number of tests, complaining that the operation of the mills will thereby be seriously delayed, and that the cost of testing will be greatly increased, both of which will tend to increase the cost of the finished product.

Segregation now presents the great problem in the manufacture of sound rails, and the drop tests do not necessarily indicate the presence of this defect. The nicking and breaking of test pieces suggested by Captain Hunt should disclose the presence of segregation. The seriousness of segregation is indicated by

the fact that practically all broken rails, causing severe wrecks, show evidences of extreme segregation. The sound rail does not shatter when breaking, and is held in place by the track fastenings.

Until sound ingots can be made, the provision for ample discard must be rigidly enforced. Several years ago the railways advocated the shearing of a definite percentage of discard from the top of each ingot while the manufacturers advocated a flexible limit, depending on the condition of the ingot. Their respective positions have now been reversed, and the railways demand a sufficient discard to insure a sound ingot, while the manufacturers endeavor to place the responsibility on the railways by demanding the specification of a definite percentage. As Captain Hunt suggests, when the manufacturers actually face the necessity past history indicates that they will find uses for this discard which enable them to avoid wasting it, and that eventually sound ingots will be possible. Until this time comes the railways cannot afford to let down in their specifications, but on the other hand, must increase their rigidity so that it will be practically impossible for a defective rail to get into the track.

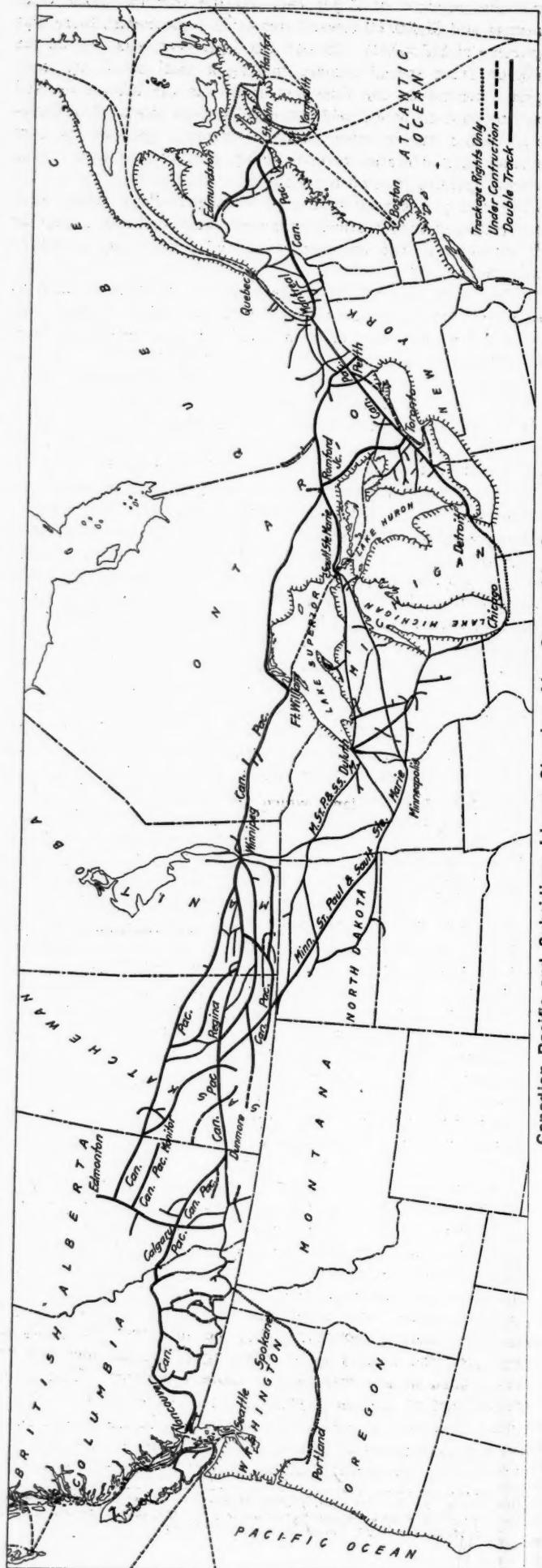
CANADIAN PACIFIC.

IT is probable that there will be few roads of importance in the United States that will not show an increase in the ratio of expense to total operating revenues in the fiscal year ended June 30, 1912, as compared with 1911. There may be some particular exceptions to this, but, in general, the prediction is fairly safe. The forces that are responsible for this are increases in wages, bad weather conditions in the past winter, strikes both on railway lines and in coal mines, and a host of other causes, some general, some special to individual roads.

There are two conditions which contribute to a higher operating ratio which reflect no discredit on a management, but which are, nevertheless, compelling. These are an increase in the proportion of branch line mileage operated, and a reduction of the average ton-mile rate. An increase in branch line mileage, almost without exception, is a cause of a higher operating ratio, other things being equal. A reduction in the average ton-mile rate, due entirely to a very much heavier movement of low-grade freight which may be very much more heavily loaded, is not always a cause of a higher operating ratio.

The Canadian Pacific in the past few years has added a very great mileage to its branches. In 1912 its average ton-mile rate was 7.72 mills as compared with 8.19 mills in 1911. We might fairly expect, therefore, to find a decidedly higher operating ratio in 1912 than in 1911, since a great many of the same causes that have affected roads in the United States have also affected the Canadian Pacific. There have been the same, or, in some cases, even greater, increases in the cost of labor and of materials, and the winter was severe. As a matter of fact, however, working expenses for the year amounted to 64.89 per cent. of gross earnings, as compared with 64.77 per cent. in 1911. Progress has been made in train loading, the average train load in 1912 being 372 tons, or 10.67 per cent. greater than in 1911. The figures, however, for car and train mileage, train and car loading, etc., and for cost of transportation and for maintenance do not show by any means a great enough change in operating efficiency in 1912 as compared with 1911 or 1910 to explain the maintenance of the same operating ratio during last year as during the year before.

The explanation of the great prosperity of the Canadian Pacific lies in two quite different facts. The first fact is the tremendously rapid growth of the country traversed. The second is the policy which has been pursued by the Canadian Pacific of conserving to the company all of the possibilities for earning money which are developed by a railway, but which are not considered in the United States a necessary part of railway business proper. The Canadian Pacific earned gross in the year ended June 30, 1912, \$123,320,000. After the payment of expenses, taxes and fixed charges there was a surplus of \$33,880,000, and



Canadian Pacific and Subsidiary Lines; Showing Also Steamship Connections.

after the payment of 7 per cent. on the common stock from earnings and \$1,000,000 toward steamship replacement, there was a surplus of \$17,560,519. In addition 3 per cent. was paid on the common from special income, making a total of 10 per cent. Special income on the Canadian Pacific is the income derived from interest on bonds held and dividends on stock. The Canadian Pacific has its own express company, operates its own sleeping cars, operates its own dining cars and its own hotels. It even operates its own news stands.

The land grants made by the government to the company have been managed conservatively and with great skill and always in the interests of the company itself and not of any group of individuals.

It is due to this policy of the company, of itself getting *all* the profits that accrued, combined with the growth of the country, that has put the Canadian Pacific in the position to earn the rather awe-inspiring sum of over \$123,000,000, and to operate its property, even in a year of adverse general conditions, on as low a basis as in the previous year.

The railways of the United States have granted to individuals or outside companies many concessions which owe their possibility of making a profit to the existence of the railway, but which are not of themselves a part of actual transportation. The consequence has been that in the United States we have wealthy express companies, sleeping car companies and so on, the prosperity of which does not help the railways. The profits of these outside companies have grown with the prosperity of the country at a far more rapid rate than their cost of doing business. The Canadian Pacific in being the sole beneficiary of these rapid increase in profits, is able to show a *total* increase in earnings which more than offsets the increase in expenses.

In the annual report for 1912 there is a good illustration of what is meant by conserving to the company all of the opportunities for profit that come to a great railway. In 1905 the Canadian Pacific bought the Esquimalt & Nanaimo. At the time the Canadian Pacific bought this the latter had about 1,400,000 acres of land grant land which its owners feared would be subject to taxation or some other burden if it were separated from the railway. This land was, therefore, bought by the Canadian Pacific for \$1,330,000. It was bought, it will be noted, by the railway company, not by a syndicate. Thus far 250,000 acres, or about one-seventh of the total of these lands, have been sold for \$3,364,000, and the report says that the remaining land is of great value. This is the kind of policy that has made the Canadian Pacific Railway Company what it is.*

In 1912 the Canadian Pacific spent \$12,040,000 for additions to and improvements in its main line, and \$2,930,000 for additions and betterments to its branch lines, and for certain additions and betterments to office buildings and to telegraph lines. Of the total amount spent on main line, only \$4,830,000 was for sidings and for additional tracks. Most of the remainder was spent for improvements having to do with terminals and terminal facilities. The expenditures for terminals made by the Canadian Pacific in the past few years have been extraordinarily great. The management has profited by the lessons of roads in the United States, and has bought ample land for terminal facilities while the country is still developing and before the land for these facilities becomes so valuable as to make the cost of its acquisition for railway purposes almost prohibitive.

The Canadian Pacific's needs at present are not so much for additional lines—although we may be sure that the policy of developing the country by the building of branch lines will not be curtailed in any way—as for more equipment. This is, of course, just at present a pressing need, since crops are being moved as rapidly as cars can be supplied. The Canadian Pacific has not only given orders to its own shops up to their full capacity for equipment, but has ordered equipment from the

United States, deliveries of which are at present delayed by the press of work in American shops. Crop prospects in Canada are very good, indeed.

It is interesting to note the changes in classes of commodities carried during the past three years. The Canadian Pacific does not reduce its various classes of commodities to the same unit (tons) as is done in American railway reports, but does give figures from which the changes from year to year in tonnage, in bushels, etc., of various commodities can be traced. There was a noticeable increase in the tonnage of manufactured articles carried between 1911 and 1912. In 1911 5,760,000 tons was carried; in 1912, 7,200,000 tons. Flour, on the other hand, furnished a smaller amount of traffic in 1912 than in 1911, there being 8,470,000 barrels carried in 1911 and 8,460,000 in 1912. The large increase in traffic from the increased movement of manufactured articles reflects the rapid growth of the country and the rapid growth in the power of consumption of manufactured articles of its people.

The Canadian Pacific's balance sheet is an impressive statement. At the end of the fiscal year 1911 there were on hand \$34,370,000 cash and \$10,090,000 temporarily invested in government securities. At the same time there was but \$17,200,000 current liabilities. At the end of the fiscal year 1912 there were \$33,630,000 cash and \$10,090,000 invested in government securities, with \$23,550,000 current liabilities. It has been the policy of the company to write off of its books the value of land grants made by the government so that they do not appear on the balance sheet at all, although the company owned at the end of 1912 6,660,000 acres of land worth at the average price per acre which was received last year, over \$100,000,000. And, in addition, the company owns in British Columbia 4,428,000 acres.

The Canadian Pacific's United States traffic affiliations in the East are with the Boston & Maine and its parent company, the New York, New Haven & Hartford, and this alliance competes keenly with the Grand Trunk, which has its own entrance through the Central Vermont into New England, and which is building the Southern New England to Providence. Notwithstanding the competition that the Canadian Pacific will have to meet from the Grand Trunk, the Grand Trunk Pacific and the Canadian Northern, it is an unusually strong strategic position. Moreover, it is in an unusually strong strategic position as regards rate reductions by government commissions. It is hardly likely that the Canadian government would reduce rates below what would yield a fair return to either the Grand Trunk or the Canadian Northern. On any competitive rate that will yield a fair return to either the Canadian Northern or the Grand Trunk the Canadian Pacific can earn a very substantial return. In other words, it has such a long start of its competitors, and it has in the past been so conservative in its financing and so forehanded in its plans, that it is now in a position to face without fear either competition from new lines or regulation of its rates by government authorities.

The following table gives the principal figures for operation in the fiscal year ended June 30, 1912, compared with the 1911 fiscal year:

	1912.	1911.
Average mileage operated	10,983	10,481
Freight earnings	\$79,833,734	\$65,645,227
Passenger earnings	31,812,208	28,165,556
Total* earnings	123,319,541	104,167,808
Maint. of way and structures..	17,719,795	15,561,086
Maint. of equipment	13,608,708	12,056,260
Traffic expenses	2,880,800	2,623,280
Transportation expenses	38,923,050	31,537,519
Total* operating expenses.....	80,021,298	67,467,978
Net earnings	43,298,243	36,699,831
Net corporate income.....	32,752,754	26,727,109
Dividends†	15,192,235	14,853,866
Surplus	17,560,519	11,873,242

* Included in both total earnings and total expenses are earnings from sleeping car companies, express operations, etc.

† In addition 3 per cent. (\$5,400,000) was paid from special income in 1912 and 2½ per cent. (\$3,900,000) in 1911.

* Earnings of the Canadian Pacific steamship companies and of certain other operations which the company manages are not taken into the general revenue account of the Canadian Pacific Railway.

ELECTRIFICATION OF OAKLAND SUBURBAN LINES.

Development of Southern Pacific Passenger Lines in the Residential Districts on the East Shore of San Francisco Bay.

BY R. T. GUPPY,
Engineer, Suburban Lines, Southern Pacific, Oakland, Cal.

The cities on the eastern shores of San Francisco Bay, with a population of about 275,000, had until recently been served by the Southern Pacific with steam local service in connection with two separate ferry lines running across the bay to the city of San Francisco. One system of steam locals, radiating from Alameda Mole, served the city of Alameda on the south side of Oakland harbor, and also reached the heart of Oakland with the so-called Webster Street line. The other system, radiating from Oakland Pier, served Oakland, East Oakland, Fruitdale and Melrose toward the east and the city of Berkeley and the town of Emeryville toward the north. The Oakland Pier ferries also handle the main line passenger business to San Francisco.

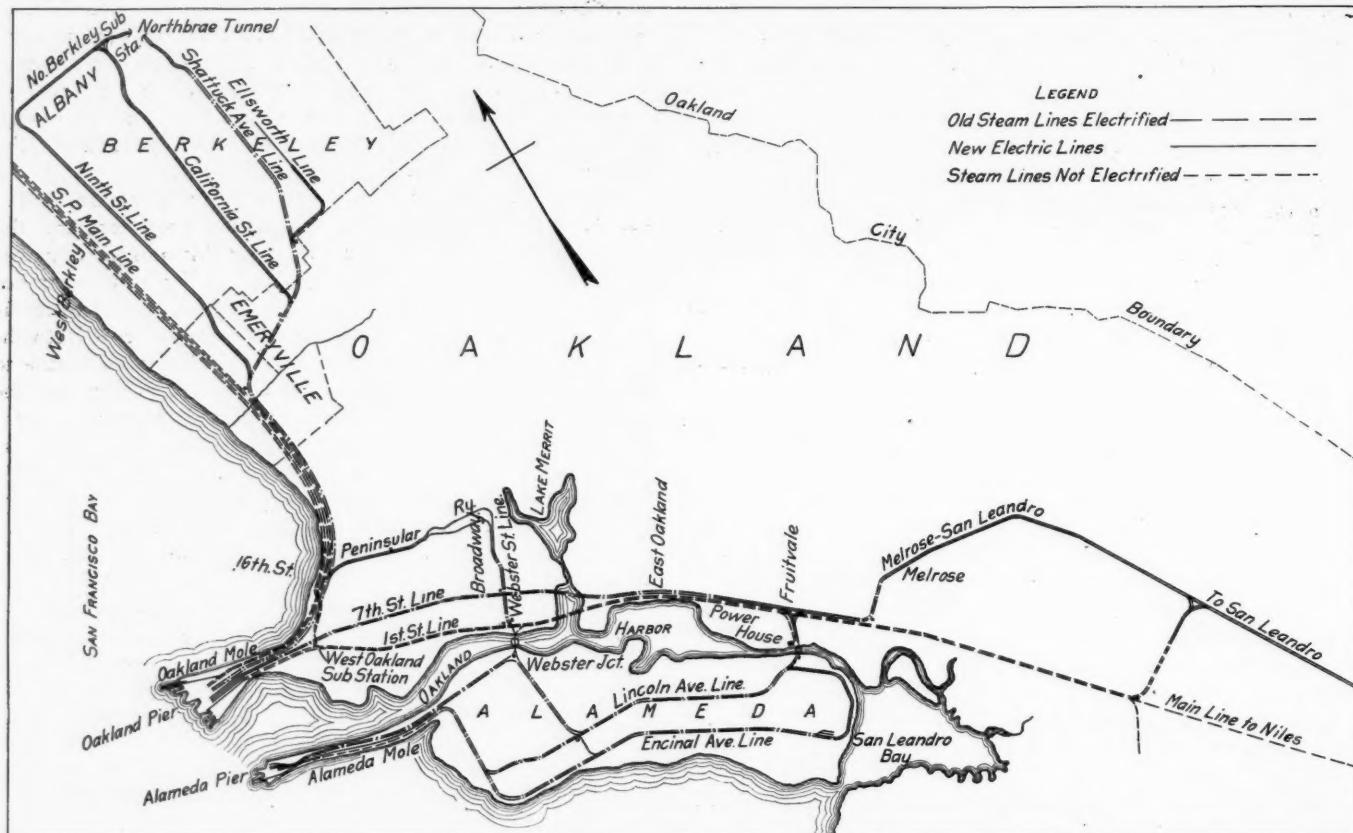
The growth of trans-bay passenger traffic during the last few years, consisting principally of people living on the east shore of the bay and employed in San Francisco, has brought the

of which is double track. In addition to the old lines 21.1 miles of new extensions have been built for electric operation, nearly all of which is double track. Of the old steam lines, 19.6 miles are on private right-of-way and 9.7 miles on public streets, and of the extensions 4.3 miles are on private right of way and 16.8 miles on streets.

Seventy-five lb., 80 lb. and 90 lb. rail are used on private right of way and in macadamized streets and 141 lb. girder rail in asphalt streets. The track is practically all ballasted with crushed rock, 8 in. of ballast being placed under the ties. The ties are mostly redwood.

TRACK CHANGES AND EXTENSIONS.

On account of the large increase in the number of suburban trains incident to the electrification and extension of local lines



Location of Electrified Lines of the Southern Pacific in Oakland, Cal.

average number of ferry passengers up to 1,500,000 per month. In order to facilitate the handling of this constantly increasing passenger business, with the resulting morning and evening rush hour congestion, and to reach new and promising territory, the Southern Pacific decided to electrify the existing steam lines and to build a number of extensions. Work was begun in the spring of 1909, and as the new lines have approached completion and been placed in operation, the increased real estate activity and home building have again demonstrated that extensions of rapid transit facilities into well located but undeveloped territory may be expected to promote the growth of the districts traversed and so build up traffic for themselves.

The accompanying map of Oakland and vicinity shows the old steam lines electrified, a total of 29.3 miles of road, nearly all

radiating from Oakland Pier it was necessary to rearrange the entire track layout of this terminal, and this was so done as to provide main line and suburban trains with separate tracks. There are now eleven tracks running the full length of the Mole. The terminal yard at Oakland Pier, developed from the main line and running track, consists of 15 tracks for incoming and outgoing trains in the train sheds, 8 of these being for main line steam business and 7 for electric suburban business, the former being in the north part of the sheds and the latter in the south portion. Storage tracks for main line baggage and passenger coaches and private car spurs are provided on the north side of the terminal sheds, and the Wells Fargo Express business is taken care of at the same point. Storage tracks for electric suburban coaches are provided on the south side of the

terminal sheds. A modern all-electric interlocking plant, with reinforced concrete tower, handles the elaborate system of crossovers and turn-outs for the entire terminal yard.

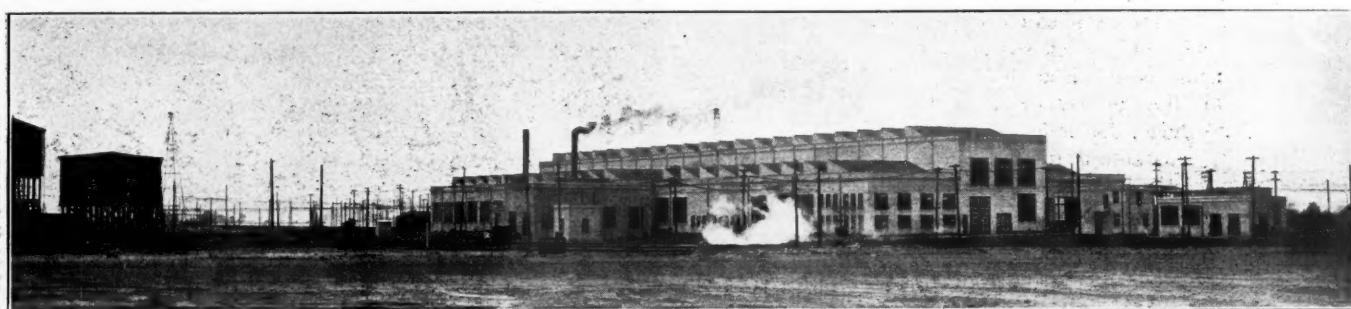
On Alameda Mole there are four parallel main tracks from the terminal yard at the ferry slips to West Alameda, about two miles. There are several storage tracks at this terminal, with ample room for extension, if needed. Two hundred and thirty trains per day are operated on lines radiating from Alameda Mole, all handling suburban business over electric lines.

The inspection, painting and repair shops for the electric equipment of these local lines are located in West Alameda, and are equipped to handle all of the work on these cars without depending on the old passenger coach shops, or machine shops, used by the steam lines in West Oakland. The building is 460 ft. long by 200 ft. wide. The inspection bay, running the full length of

In addition to the storage tracks at the two ferry terminals and the car shops there are storage yards at or near each of the outside terminals; that is, at the easterly end of Oakland, the northerly end of Berkeley, the easterly end of Alameda and at Fourteenth and Franklin streets in the central part of Oakland. Under the present method of operation trains are stored overnight at these outside terminals, the first runs in the early morning being towards the ferry terminals. Trains are filled out or cut down in accordance with the decrease or increase of traffic at the ferry terminals, where extra cars are stored. No extra cars are kept in the outside terminal yards during the daylight hours.

SIXTEENTH STREET PASSENGER STATION.

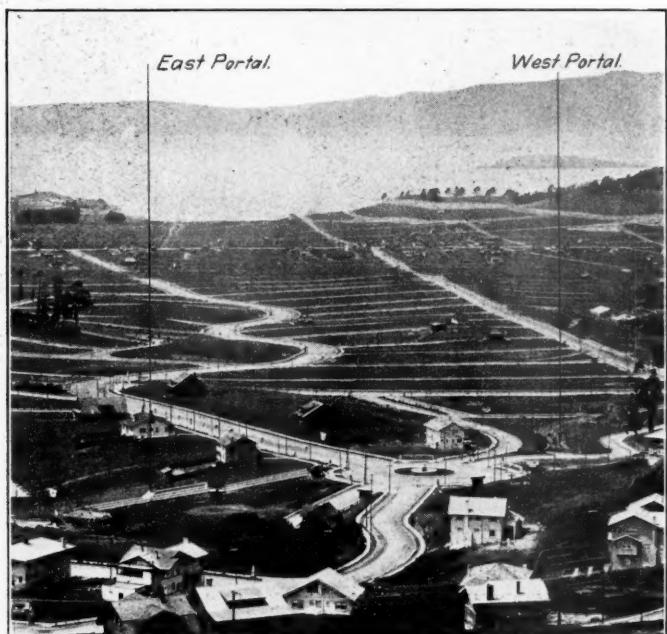
Although not entirely incidental to the electrification project, it is well to call attention to the erection of the new passenger



Shops at West Alameda for Electric Equipment.

the building, will accommodate 18 cars. The repair bay and machine shop will accommodate 9 cars, and the machine shop at one end contains a wheel lathe, boring mill and wheel press, in addition to other smaller machines ordinarily used in a shop of this kind. A 20-ton traveling crane runs the entire length of the building in this bay, and is used for lifting cars, trucks and motors, also for handling wheels and axles and heavy work around the machines. The paint shop occupies the west end of the south bay, the other end being utilized for store-room, laundry, sub-station, etc. The paint shop will take care of 12 cars. In addition to the main shop building there is a boiler house, a blacksmith shop and a motormen's headquarters. All four of these buildings are of reinforced concrete. The large yard surrounding these buildings contains approximately five miles of track room for the storage of extra equipment, for switching in and out of shops and for testing purposes.

station at Sixteenth street, Oakland, as in planning this building provision was made for the accommodation of suburban electric line passengers as well as main line passengers. The main line tracks are retained at their old elevation, and passengers are handled on the ground floor of the new building, there being ample facilities for baggage and mail business, with provision for telephone booths, police station, transfer agents, etc. The suburban electric tracks are elevated to the level of the second floor, where there is a large concourse adjacent to the elevated tracks, with two stairways from the main floor. Two baggage elevators are provided to facilitate transferring from main line trains to suburban trains. There is an incline at the north end of the building, bringing the elevated tracks to the same elevation as the main line tracks, using a 4 per cent. grade. On the south end the elevated structure is continued far enough to provide an under-grade crossing for freight tracks which proceed into the



Location of North Berkeley Tunnel.



Type of Overhead Construction Used on Private Right of Way.

West Oakland yards. The freight tracks and main line passenger tracks cross each other at grade. Beyond these crossings the elevated tracks are brought down to the end of the main line steam tracks on a 4 per cent. incline. The crosstown line from the heart of Oakland, called the "Peninsular Railway," is connected by means of an incline on a $7\frac{1}{2}$ per cent. grade with the Berkeley suburban tracks on the elevated structure, thus providing for express runs from the heart of Oakland into Oakland Pier. Street cars which operate over this crosstown line terminating at Sixteenth street will be accommodated by means of a loop on the natural ground level east of the building near the main entrance.

ELECTRICAL EQUIPMENT.

The power for these electric lines is generated at a new station which has been installed on the north bank of the easterly end of the tidal canal, which separates Alameda and Oakland. This power house is an elaborate steam installation, and is so designed as to allow of increase of capacity. At present there are two Westinghouse double-flow turbo-generators of 5,000 k. w. rated capacity, guaranteed for twice their rated load for one minute and for 7,500 k. w. for two hours. They supply 3-phase, 25-cycle alternating current at 13,200 volts when operating at

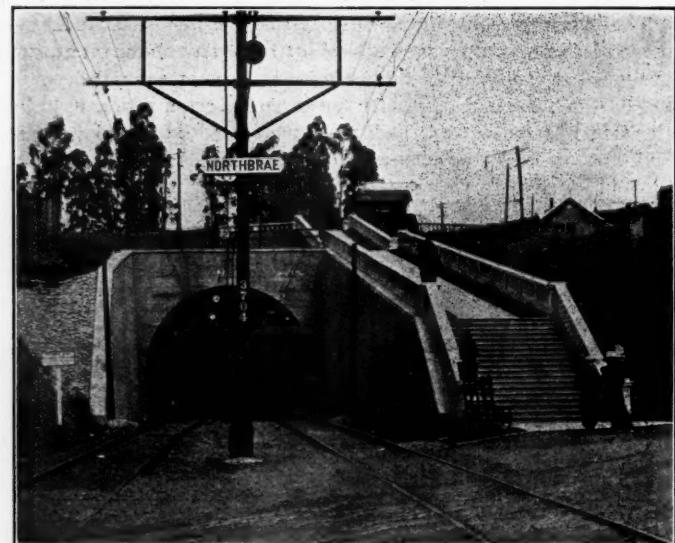


Type of Overhead Construction Used on the Streets.

1,500 r. p. m. Without increasing the size of the building, two additional generators can be installed. The boiler room, containing 12 645-h. p. Parker boilers, is located on the second floor of the building, leaving the basement space underneath vacant for possible future coal handling and ash handling apparatus if it should ever become necessary to use coal instead of oil, which is the fuel now used. Four additional boilers can be installed without increasing the size of the building. Salt water for the condensers is obtained from the adjacent tidal canal. The foundations of the building and the circulating tunnels are of reinforced concrete up to 7 ft. above the ground and from there of red brick trimmed with sand-lined brick. The main roof is covered with terra cotta tiling supported on an angle-iron frame.

The high tension current from the power station is distributed at present to three substations, one at the power station, one at West Oakland and one in North Berkeley. Each of the substations is provided with conversion and control apparatus to supply 1,200-volt direct current to the trolley lines. The substation at the power house is located in the east end of the main structure. The other two substations are built of reinforced concrete. The high tension lines from the power station to the

two substations at West Oakland and North Berkeley are partially overhead and partially underground, those overhead being carried on latticed steel poles, except where they parallel the two-track and four-track catenary bridges, where they are carried on extensions to the end supports of the bridges. There are two duplicate high tension lines from the power station to the West Oakland substation, one running partially overhead and partially underground through the southern portion of Oakland, and the



Portal of North Berkeley Tunnel.

other crossing the tidal canal at the substation by means of a submarine cable; running thence overhead through Alameda and again crossing the Oakland harbor by means of a 1,290-ft. long span 200 ft. above high water supported on three towers, two of them being 250 ft. high on each side of the harbor and the third one 35 ft. high, 1,331 ft. from the middle tower. These towers also support the 1,200-volt d. c. feeders supplying the west end of Alameda with power for trolleys.

On all the electric lines now under construction the overhead



East End of Northbrae Tunnel.

catenary construction is built to provide for the operation of a roller type pantograph at speeds up to 45 miles per hour with an upward pantograph pressure ranging from 25 to 36 lbs. On private right of way, wherever it has been possible to do so, the overhead construction is supported on steel bridges spaced 240 ft. apart, some spanning two and some four tracks. In public streets the overhead construction is supported on steel tubular poles,

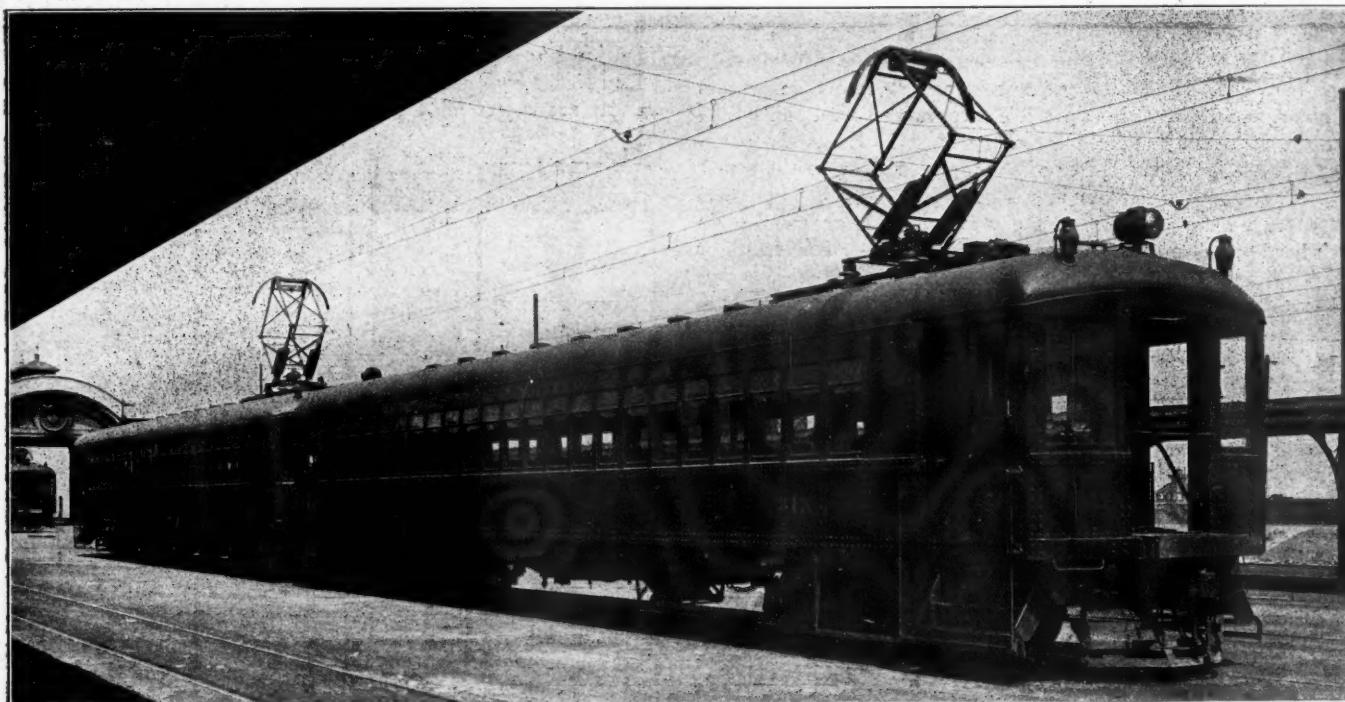
sometimes centered between tracks and sometimes on the curb lines outside of the tracks, depending on the width of streets, or the requirements of the different franchises. In general these poles are spaced 120 ft. apart lengthwise of the track, although they are occasionally varied to 90 or 60 ft., particularly on sharp curves.

The Southern Pacific has expended considerable money in providing the best of safety devices in connection with the electrification project, but particularly in the case of automatic block and interlocking signal systems. There are numerous junctions, as well as grade crossings, and all of these have been interlocked with the exception of the crossings with the street railways.

In addition to the other structures heretofore mentioned, it was necessary to build a tunnel 465 ft. long in North Berkeley, where the line passes under a point from which several streets radiate. Conditions were such that the construction of the tunnel was an easier solution of the problem than building an open cut and supporting the several streets by means of bridges. This tunnel is concrete lined throughout and provides room for two tracks, which at this point are curved to a radius of 350 ft. There are

properties bought were already more or less improved, making it necessary to tear down, sell or move a large number of residences, most of which, however, were of comparatively small value.

All-steel cars are used for the equipment of these electrified lines. Three types of cars are in use on the suburban lines now in operation, all of the same general dimensions, viz., 72 ft. 10½ in. long over buffers and 10 ft. 4 in. wide over side sills. There are now in operation 25 combination coach and baggage motor cars, 40 motor coaches and 59 trailer coaches. Each motor car has enough motor capacity to handle and control a trailer car. Trains are made up of from three to six cars in general, composed of a combination motor car and an equal number of motor and trailer coaches. The dimensions given above permit the use of 3-passenger seats on one side of the 25¾ in. aisle and 2-passenger seats on the other side, thereby increasing the seating capacity 25 per cent. The motor and trailer coaches will seat 116 passengers, and the combination baggage and motor coach 88 passengers. The motor coaches, when fully equipped and ready for service, weigh 109,400 lbs., and the trailer coaches 67,200 lbs.



Equipment Used on the Southern Pacific Electrified Lines.

also several overhead and undergrade highway crossings, as well as concrete arches of various sizes carrying the waters of small streams.

One of the large items of expense in the whole electrification project was the street improvement work required of the railway company by the city authorities. One of the conditions of the franchise covering the Seventh street line through Oakland was that the railway company should pave the entire width of the street with standard asphalt pavement, placing granite curbs and basalt block gutters for a distance of approximately 2½ miles. This work was done at an approximate expense of \$300,000. Other franchises in Oakland required that certain streets, which were about to be paved with standard asphalt pavement, be widened, placing the burden of the greater portion of the expense on the railway instead of the property owners. In other parts of Oakland and in Berkeley it was necessary to macadamize nearly all of the streets. A certain amount of this kind of work also had to be done in Alameda, but not so much.

As may be supposed, taking into consideration the recent appreciation in land values, large expenditures were necessary in purchasing right of way for the new electric lines and property for locations of the various buildings. In nearly all cases the

weight per passenger seat, based on the combination seating capacity and weights of a motor coach and a trailer coach, is 761 lbs.

It is proposed to shortly handle switching of industries and freight tracks in Berkeley and Alameda by means of electric locomotives, and equipment for this purpose has been ordered.

The Southern Pacific Company has heretofore operated a private telephone exchange covering a small territory from Oakland Pier to West Oakland. In connection with the electrification project this telephone exchange is being extended and rebuilt so as to cover the entire electric zone. This telephone system will handle all the railway business, both in connection with the main line steam service and the electric service in Oakland, Alameda and Berkeley.

The entire project was executed under the general direction of E. E. Calvin, vice president and general manager (now vice president), and W. R. Scott, assistant general manager (now general manager), and under the immediate direction of J. Q. Barlow, assistant chief engineer, with whom were associated A. H. Babcock, electrical engineer, and W. W. Slater, signal engineer. The execution of the work was in immediate charge of the writer.

INSURING SOUNDNESS IN STEEL RAILS*.

Advocates Discarding One-Third of Ingot Until Methods Are Developed Which Will Insure Their Being Sound.

BY ROBERT W. HUNT.

While steel rails have been of great scientific and engineering interest from the day of their first experimental use, and much literature has been written upon them, there has never been a time, at least in America, when matters relating to their manufacture and service have received as much public and even governmental attention as during the past two years. I have been actively identified with the manufacture of steel rails from the rolling of the first commercial order for them in America up to and including the present time. As a steel maker I became thoroughly familiar with the theoretical and practical details of the business; and later, as a consulting engineer and inspector of all steel products, and especially of steel rails, I have endeavored to keep in touch with and cognizant of everything relating to the art.

All steel rails are made from steel ingots. Steel ingots are formed by pouring or casting liquid steel into cast iron ingot molds. The larger the cross section and the greater the length of the ingots, the greater the difficulty in obtaining sound castings, i. e., sound and homogeneous ingots. Without sound and homogeneous ingots it is impossible to produce sound and homogeneous rails; and, unfortunately, the most important unsoundness will be first in the center of the ingot, and last in the center of the rails produced from it, where it is frequently impossible to detect without destroying the rails. The large tonnage in each heat of rail steel (whether made in Bessemer converters or in open-hearth furnaces) under present mill practice, necessitates the casting of ingots of large cross-section and long enough to make several rails.

It is a long-known fact that the greater the mass of steel in a casting, the greater the tendency of the metalloids (carbon, phosphorus, sulphur and silicon, and particularly the hardening metalloids, phosphorus and carbon) to segregate at the part of the casting where the metal remains longest liquid, which, under normal conditions, is at the center and toward the top of the mass. Again, it has long been known that the necessary cooling of the metal from the outside inward causes a contraction which results in the formation of a cavity or "pipe," which defect is increased by hasty and uncontrolled casting of the molten steel into ingot molds. Over twenty years ago Robert Forsyth, then chief engineer and manager of the Union Steel Company, Chicago, Ill., demonstrated that if rail-steel ingots were laid on their sides before the interior steel had set, the pipe would not be formed in the middle of the top end of the ingot, but upon the upper side and liable to extend toward the bottom end; and that, therefore, ingots should be left standing in a vertical position until the interior metal had solidified. (*Journal of the Franklin Institute*, Vol. 127, May, 1889).

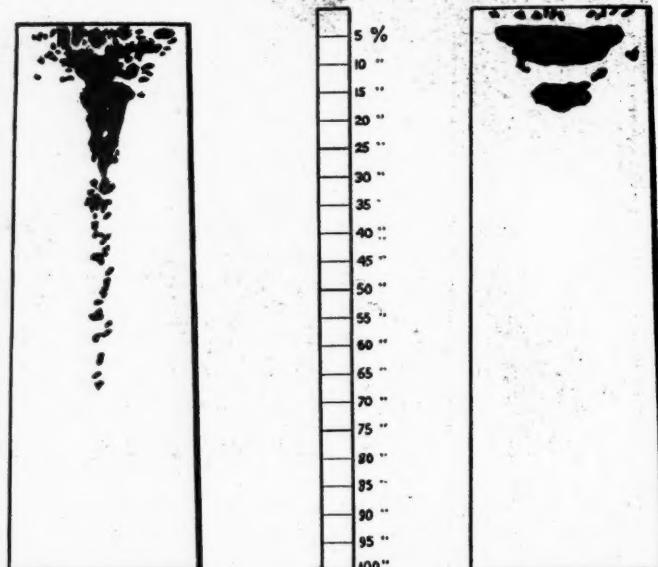
Much time, labor and money have been expended in seeking to overcome the piping and segregation in ingots without greatly increasing the cost of production through expense of operation, lessening product, etc. Technically several of the schemes have given good results, but they require increased cost of manipulation, and, most serious of all, more time. Unfortunately for success in casting sound ingots, modern practice has been in the direction of larger heats of steel, and it is easy to appreciate that with a casting ladle containing up to 100 tons of liquid steel, much if any control of the stream flowing through its nozzle is an impossibility. Therefore, the soundness of the resulting ingots is a matter entirely independent of the personal skill of the workmen. However, while the efforts to produce sound ingots have not been generally commercially successful, I am loath to believe that the difficulties will never be overcome. Such has not been the spirit under which the great successes of the past were accomplished, and I do not think it now exists. If a posi-

tive necessity for sound ingots be commercially established, a commercial way to produce them will be found.

As the general existing conditions produce ingots with the most undesirable steel in their upper part, it has been and is the practice in manufacturing steel locomotive tires, ordnance forgings, armor plate, large steel shaftings and other what are termed high grade products, to reject arbitrarily at least the upper one-third of the ingot. It is true that even so great a discard will not always prove an absolute safeguard, but if the ingots are carefully made it will do so. Against bad or ignorant workmanship it is hard to find any absolute protection.

In rail purchases it has been found impractical to secure so great a discard. Personally, I believe the future will bring it, unless the insistence upon it shall lead to improved methods in casting ingots; until that time comes, I think that, through the railmakers developing other uses for the discarded steel, the decided increase of cost will be avoided.

Experience has proved that rails made by the basic open-hearth process are more liable to have interior pipes and segregated



Figs. 1 and 2—Cross-Section of Ingots from the Same Heat Showing Different Depths of Piping.

spots than Bessemer rails; no doubt principally because the ingots are larger and the size of the heats prevents slow casting. Of course the smaller contained percentage of phosphorus lessens the danger from its segregation, but the greater carbon content made possible by the low phosphorus increases the segregation of that element.

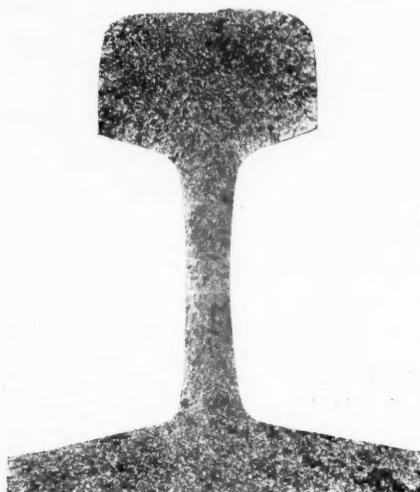
Intelligent and careful investigation by a committee of the American Society of Civil Engineers, of which I had the honor of being secretary, resulted, August 3, 1893, in the recommendation of a series of rail sections which, while not adopted by all American railways, were used by so great a number that they became accepted as standard sections. In 1902 another committee was appointed by the same society, of which also I was secretary. That committee, while deciding not to recommend any changes in rail sections, did present certain specifications governing the manufacture of rails. Later developments resulted in that committee asking to be discharged in favor of one more directly representing the railway organizations of the country; and this committee (American Railway Association committee) recommended, under date of March 23, 1908, a series of rail sections which have, to a certain extent, displaced the so-called American

* Presented at the Sixth Congress of the International Association for Testing Materials, New York, September, 1912.

Society sections; and, in my judgment, wisely so. The same committee has recommended rail specifications; several railway companies have adopted their own, and the rail manufacturers have what are known as Standard Specifications, all seeking to secure good-wearing and safe rails. All of this has been accompanied by much discussion, and I know has resulted in much good; but we are still away from the desired certainty of safety.

I believe we can afford to let the chemical requirements remain as they are in most of the specifications. Their physical requirements as to finishing temperature also are sufficient, and most of

others (say 4 in Bessemer or 29 in open-hearth practice) are also good castings. As showing what does happen, I give diagrams (Figs. 1 and 2) of two ingots which were cut longitudinally through their centers. With such variation as here shown, it follows that the test piece from one ingot would not be representative of the other one. Therefore, I favor drop-testing as now, and nicking and breaking those test pieces, and also a piece from the rails made from the upper end of each and every one of the other ingots, and accept the seemingly sound and reject the proven unsound A rails. And I would go further and provide that,



ANALYSES.
Corner of head: .674 Carbon, .023 Phosphorus
Center of web: .895 Carbon, .047 Phosphorus
Fig. 3—Photograph of Fracture Showing Evidence of Segregation Along Center of Web.



ANALYSES.
Corner of head: .674 Carbon, .023 Phosphorus
Center of web: .895 Carbon, .047 Phosphorus
Fig. 4—Photograph of Section in Fig. 3 After Being Etched.



ANALYSES.
Corner of head: .721 Carbon, .035 Phosphorus
Center of web: 1.030 Carbon, .067 Phosphorus
Fig. 5—Photograph of Fracture Showing Evidence of Segregation Along Center of Web.

them provide for sufficient drop-testing so far as determining the quality of the steel of the several heats as metal; but they do not go far enough to give protection against unsound castings (i. e., ingots). Practically all specifications require that the test piece shall be taken from the upper end of the rail made from the top of the ingot; and several require that after drop-testing if the piece has not broken it shall be nicked and broken to expose the interior, and if the interior of the rail shows any defects all of the A or top rails of the heat shall be rejected.

TEST PIECE FROM EVERY TOP RAIL.

So far, so good. But each ingot is an individual or separate casting; and because one is sound, it does not prove that the

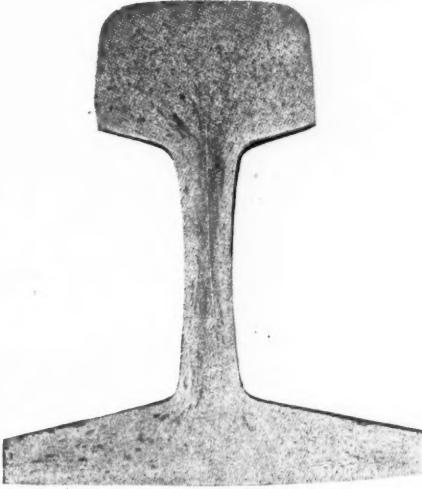
where unsoundness is shown, another test piece shall be cut from the lower end of the represented A rail and nicked and broken. If it also shows unsoundness, then the B rail of that ingot shall also be rejected, and another piece cut from the lower end of that B rail, and, if unsound, the C rails condemned; and so on for the remainder, if any, of the ingot. This makes a practical way of determining how far the pipe or segregation has extended down the ingot, with the minimum destruction of merchantable rail. Such a plan of testing is not entirely new in principle, and was in part suggested by the late William Metcalf in 1908, when he was consulted by the Rail Committee of the American Railway Association. The additional test pieces can be taken from the rail ends which are made in hot-sawing the rails, and can be broken



ANALYSES.
Corner of head: .721 Carbon, .035 Phosphorus
Center of web: 1.030 Carbon, .067 Phosphorus
Fig. 6—Photograph of Section in Fig. 5 After Being Etched.



ANALYSES.
Corner of head: .656 Carbon, .024 Phosphorus
Center of web: .888 Carbon, .045 Phosphorus
Fig. 7—Photograph of Fracture Showing Evidence of Segregation Along Center of Web.



ANALYSES.
Corner of head: .656 Carbon, .024 Phosphorus
Center of web: .888 Carbon, .045 Phosphorus
Fig. 8—Photograph of Section in Fig. 7 After Being Etched.

under much less cumbersome tools than the drop-testing machine and at small cost.

As to what constitutes interior defects, I unhesitatingly specify not only laps or pipes, but also silvery or bright spots, or other indications of non-uniformity. Etchings and analyses of a great many examples of the latter have proved them to unfailingly indicate segregation. I give in Figs. 3 to 8 views of the sections of nickel and broken rails, and of the same pieces after having been polished and etched; also analyses of drillings taken from the indicated positions. Table I shows the results of other analyses of such spots. These tell their own story.

TABLE I.—ANALYSES OF SEGREGATED RAILS.

Result of drop test No.	Kind of steel	Appearance of frac- ture on nick break	Appear- ance of etching	Chemical analyses			
				Mill ladle	C. P.	C. P.	Drillings from center of web
1	O. K.	Bess.	Segregated	Unsound	.45	.10	.691 .165
2	O. K.	Bess.	Segregated	Unsound	.45	.10	.634 .152
3	O. K.	Bess.	Segregated	Unsound	.46	.10	.666 .138
4	O. K.	Bess.	Segregated	Unsound	.48	.10	.761 .173
5*	O. K.	Bess.	Segregated	Unsound	.45	.10	.797 .173
6	O. K.	Bess.	Segregated	Unsound	.47	.10	.722 .142
7	O. K.	Bess.	Segregated	Unsound	.53	.10	.656 .145
8	O. K.	OH	Segregated	Unsound	.71	.029	.829 .043
9	O. K.	OH	Segregated	Unsound	.67	.040	.727 .059
10	O. K.	OH	Segregated	Unsound	.62	.022	.919 .042
11	O. K.	OH	Segregated	Unsound	.71	.039	.990 .060
12†	O. K.	OH	Segregated	Unsound	.64	.028	1.009 .057

*Analysis drillings from corner of head gave carbon .439, Phos. .063.
†Analysis drillings from corner of head gave carbon .646, Phos. .023.

Rails with segregated centers do not always fail under the drops test, nor does the elongation test which is required by some specifications indicate their existence, but, unfortunately, it has been demonstrated that rails with such hard centers fail through the softer surrounding metal breaking down and thus producing split heads and often broken rails.

USES FOR THE DISCARD.

I am fully convinced that, until sound ingots are commercially made, the safest procedure is to arbitrarily reject the upper part of every ingot for rail rolling. It has been demonstrated that high-carbon steel gives more satisfactory service in splice bars than softer steel; in fact it has been for several years the regular practice of some of the largest railway systems to use such steel, their chemical specifications being practically the same for both rails and bars. Undoubtedly this harder steel would also yield good results in tie plates and where the danger of interior unsoundness renders this steel undesirable for rails, said unsoundness, when existing, would not of necessity make it unsuitable for either splice bars or tie plates. These two articles would furnish

a place for the use of a large part of the steel contained in the greater discard in the rail practice. Obviously its use would revolutionize the splice plate and tie plate making, but there have been many metallurgical revolutions and all of them have tended toward the betterment of the iron and steel industry.

It may be that present and future railway practice will require rails of heavier and otherwise different sections from the present ones, but we can never escape from the necessity of having them physically sound. As the section is increased, so must the work of rolling it decrease, and thereby the evil effects of want of homogeneity and unsoundness be augmented.

ACCIDENT BULLETIN NO. 43.

The Interstate Commerce Commission has issued Accident Bulletin No. 43, containing the record of railway accidents in the United States during the three months ending March 31, 1912. The number of persons killed in train accidents was 267, and of injured 4,785. Accidents of other kinds, including those sustained by employees while at work, by passengers in getting on or off cars, by persons at highway crossings, by persons doing business at stations, etc., by trespassers, and others, bring up the total number of casualties, excluding "industrial" accidents, to 22,882 (2,383 killed and 20,499 injured). The casualties are classified in Table No. 1, given herewith, which includes some details from Table 1B, not here shown. (The accident statistics of electric lines are given in a separate table.) Supplementing the statement of railway accidents proper, the commission gives the following record of "Industrial Accidents"; those occurring to employees of the railway on railway premises in which the movement of cars or engines is not involved:

	Industrial accidents to employees.	Killed.	Injured.
While working on tracks or bridges.....		47	4,114
At stations, freight houses, engine houses, coaling stations, water stations, etc., where no moving railway car or engine is involved		19	6,088
In and around shops.....		19	11,072
On boats and wharves.....		5	316
At other places.....		8	1,386
Total		98	22,976

Adding the casualties to employees in industrial accidents to the figures given in the larger table, the total number of employees killed, including those not on duty, is 1,049, and injured, 37,539; and this makes the total number of persons killed, all classes, 2,481, and injured, 43,475.

TABLE NO. 1.—Casualties to passengers, employees, and other persons—January, February, and March, 1912.

	Passengers.		Employees on duty.		Employees not on duty.		Other persons not trespassing.		Trespassers.		Total persons.	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Collisions	20	1,231	111	1,123	2	34	1	22	3	16	137	2,426
Derailments	13	1,150	53	623	2	21	3	16	9	15	80	1,825
Accidents to trains, cars, or engines, except collisions, derailments and boiler explosions.....	24	4	185	...	1	4	28	1	...	9	238	
Bursting of, or defects in, locomotive boilers or boiler attachments .....	...	41	263	...	...	...	32	...	1	41	296	
Total train accidents	33	2,405	209	2,194	4	56	8	98	13	32	267	4,785
Accidents to roadway or bridges not causing derailment, such as fires, floods, landslides, explosions, etc.....	...	...	5	...	1	...	...	...	...	...	...	6
Coupling or uncoupling cars. (Does not include accidents with air or steam hose).....	...	49	854	...	...	...	...	...	...	...	49	851
While doing other work about trains (not in shops or engine houses) or while attending switches.....	...	38	5,640	...	...	...	...	...	...	...	38	5,640
Coming in contact, while riding on cars, with overhead bridges, tunnels, or any signal apparatus, or any fixed structure above or at the side of the track.....	...	1	24	421	1	2	...	1	5	11	30	436
Falling from cars or engines.....	4	53	110	1,666	...	10	4	12	80	91	198	1,832
Getting on or off cars or engines.....	21	516	45	2,356	13	74	4	27	105	323	188	3,296
Other accidents on or around trains not here named.....	2	629	21	342	1	42	4	133	4	38	32	1,184
Being struck or run over by engine or car at stations or yards.....	10	25	218	527	26	32	26	65	212	201	492	850
Being struck or run over by engine or car at highway grade crossings .....	...	...	165	154	21	12	12	23	632	296	830	541
Being struck or run over by engine or car at other places.....	1	144	5	110	1	66	15	230	31	42	53	592
Other causes .....	...	...	...	...	...	...	...	...	...	...	...	...
Total other than train accidents.....	38	1,369	675	12,072	63	241	237	991	1,103	1,041	2,116	15,714
Grand total	71	3,774	884	14,266	67	297	245	1,089	1,116	1,073	2,383	20,499

TABLE No. 1A.—Comparison of principal items with last quarterly bulletin and with one year back.

	Bulletin	Bulletin	Bulletin
1. Passengers killed in train accidents.....	43.	42.	39.
2. Passengers killed, all causes.....	33	27	28
3. Employees (on duty) killed in train accidents	71	78	66
4. Employees (on duty) killed in coupling.....	209	183	105
5. Employees (on duty) killed, total (Table 1B)	49	53	55
6. Total, passengers and employees (items 2 and 5, above)	884	850	647
7. Other persons killed (including trespassers, non-trespassers, and employees not on duty), all causes	955	928	713
8. Employees killed in industrial accidents.....	1,428	1,798	1,411
	98	78	113

With the exception of two items, this quarter shows increases over the same quarter for 1911, and especially is this true of the number of employees on duty killed in train accidents, which shows an approximate increase of 100 per cent. The total number of persons injured in industrial accidents constitutes nearly 53 per cent. of the whole number injured for the quarter.

The total number of collisions and derailments in the quarter now under review was 3,903 (1,674 collisions and 2,229 derailments), of which 268 collisions and 268 derailments affected passenger trains. The damage to cars, engines, and roadway by these accidents amounted to \$3,368,125. This quarter records the largest number of casualties and the greatest amount of financial loss since the quarter ended September 30, 1907; the number of derailments showing an increase of 57½ per cent. over the same quarter of the preceding year.

TABLE No. 2.—Collisions and derailments.

Class.	Number.	No. of persons killed.	No. of persons injured.	Loss.
Collisions, rear	427	48	733	\$527,450
Collisions, butting	225	62	915	437,845
Collisions, train separating	92	..	53	28,433
Collisions, miscellaneous	930	27	725	431,285
Total	1,674	137	2,426	\$1,425,013
Derailments due to defects of roadway	603	16	857	\$532,918
Derailments due to defects of equipment	1,056	19	357	883,900
Derailments due to negligence	103	4	91	47,774
Derailments due to unforeseen obstruction	139	16	138	127,946
Derailments due to malicious obstruction	15	1	26	22,061
Derailments due to miscellaneous causes	313	24	356	328,513
Total	2,229	80	1,825	\$1,943,112
Total collisions and derailments	3,903	217	4,251	\$3,368,125
Total for same quarter of—				
1911	2,801	128	2,806	2,124,090
1910	3,163	244	3,215	2,607,553
1909	2,284	163	2,315	1,847,202

TABLE No. 2A.—Derailments due to defects of roadway.

Cause of accident.	Number.	No. of persons killed.	No. of persons injured.	Loss.
Broken rail	162	8	412	\$254,088
Spread rail	75	2	103	49,568
Soft track	115	3	63	67,047
Bad ties	14	..	5	6,924
Irregular track	157	1	195	94,169
Miscellaneous	80	2	79	61,122
Total	603	16	857	\$532,918

TABLE No. 2B.—Derailments due to defects of equipment.

Cause of accident.	Number.	No. of persons killed.	No. of persons injured.	Loss.
Defective wheels:				
Broken or bursted wheel	150	1	8	\$152,371
Broken flange	138	..	19	116,133
Loose wheel	23	..	..	19,824
Miscellaneous	36	1	27	46,235
Broken or defective axle or journal	100	1	15	48,286
Broken or defective brake rigging	166	..	47	135,639
Broken or defective draft gear	29	..	6	16,583
Broken or defective side bearings	66	..	9	44,280
Broken arch bar	101	7	118	107,058
Rigid trucks	58	1	51	30,880
Failure of power brake apparatus, hose, etc.	20	..	4	16,535
Failure of couplers	40	..	3	16,907
Miscellaneous	129	8	50	133,169
Total	1,056	19	357	\$883,900

Out of a total of 386 persons killed in falling from and getting on and off cars and engines, 47 per cent. were trespassers; out of a total of 1,341 casualties to trespassers in being struck and run over by cars and engines (this does not include casualties at highway grade crossings), nearly 63 per cent. resulted fatally, and out of a total of 1,322 fatalities resulting from

being struck by cars and engines at places other than highway grade crossings, nearly 64 per cent. were trespassers; out of a total of 2,189 casualties to trespassers, 51 per cent. resulted fatally, and out of a total of 2,383 persons killed during the quarter nearly 47 per cent. were trespassers.

The bulletin contains reports of investigations of 19 collisions and derailments, notice of which must be deferred to a future issue. These 19 accidents occurred as follows:

December 30. Great Northern, Sharon, N. D.; derailment; report noticed in *Railway Age Gazette*, July 12, page 65.

January 1. Denver & Rio Grande, Salt Lake, Utah; butting collision.

January 15. Pittsburgh & Lake Erie, New Castle, Pa.; butting collision.

January 16. Louisville & Nashville, Long Run, Ky; butting collision.

January 18. Central of Georgia, Jonesboro, Ga.; butting collision.

January 22. Illinois Central, Kinmundy, Ill.; rear collision; report noticed in *Railway Age Gazette*, May 3.

January 26. Central of Georgia, Leesburg, Ga.; butting collision.

February 9. Norfolk & Western, Dry Branch, Va.; rear collision.

February 15. Pennsylvania, Warrior Ridge, Pa.; derailment.

February 15—Denver & Rio Grande, Cuprum, Utah; derailment.

February 15. Grand Trunk, North Yarmouth, Me.; butting collision.

February 17. Pennsylvania Lines, Larwill, Ind.; rear collision.

February 20. Boston & Maine, Hoosac Tunnel, Mass.; rear collision.

March 8. Georgia, Rutledge, Ga.; butting collision.

March 12. Cleveland, Cincinnati, Chicago & St. Louis, Green castle, Ind.; butting collision.

March 12. Chicago, Milwaukee & St. Paul, Oakwood, Wis.; derailment.

March 13. New York, Ontario & Western, Galena, N. Y.; butting collision.

March 22. Indiana Union Traction, Fortville, Ind.; butting collision.

March 25. Great Northern, Wrenco, Idaho; derailment.

Electric railways reporting to the commission (not included in the foregoing statistics) had 53 persons killed during the quarter and 1,029 injured; and there were 45 collisions and 34 derailments. Train accidents are charged with 5 fatalities. The total number of passengers killed from all causes was 8, and of employees 12 (3 in industrial accidents). The number of trespassers struck or run over by cars was 34; 10 killed and 24 injured.

RAILWAY AMALGAMATION IN ARGENTINA.—The plan of the amalgamation of the Buenos Ayres Great Southern Railway, Argentina, with the Buenos Ayres Western Railways comprises the fusion of the capitals of the two companies; the construction of new lines from the East to West so as to unite the trunk lines; the establishment of direct communication between La Plata and towns in the South, and the localities and lines in the West; the construction of branches to unite the main line and branches so as to serve new zones in the province of Buenos Ayres and to shorten distances, and the suppression of terminal charges for the transport of freight from the Buenos Ayres Great Southern to the Buenos Ayres Western and vice versa. While the responsible papers mildly suggest the imposition of some conditions in return for this concession, the less important ones are calling for impossibilities. The minister of public works of the province has suggested to the minister of public works of the nation, by whom the petition of the companies has been referred to the congress, that the work of the electrification of the line to La Plata should be one of the conditions to be imposed.

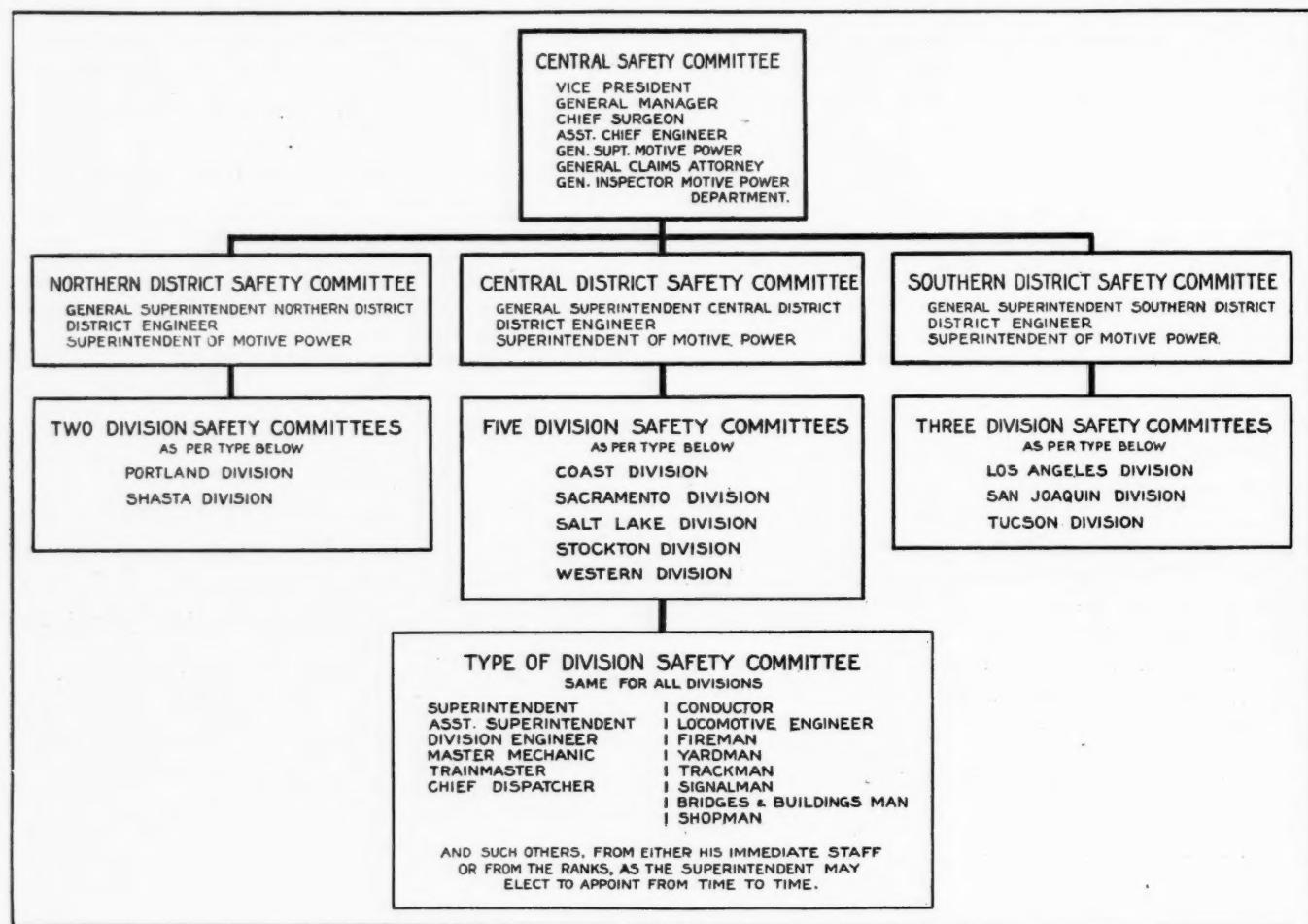
ORGANIZATION OF SAFETY COMMITTEES ON SOUTHERN PACIFIC.

The accompanying chart shows the method of organization of the safety committees formed on the Southern Pacific on July 1, when 14 permanent safety committees were established and a chief safety inspector was appointed as an additional feature in the campaign against accidents in which the Southern Pacific has been actively engaged for several years.

For many years the Southern Pacific has required to be held at each division headquarters what have been known as division meetings. At these meetings there have been present, in addition to the division staff, men from the ranks of every department of the railway. Here, men high and low in the service have met for the common good. Here have been assembled and reviewed suggestions for the good of the service.

The division safety committee, in addition to the regular staff of the division superintendent, must have at least one conductor, one brakeman, one locomotive engineer, one fireman, one yardman, one trackman, one signalman, one bridges and buildings man, and one shopman. These men are changed from time to time and other men are put in their places. By doing this, in the course of a year a very large number of employees are afforded an opportunity to contribute to the welfare of themselves and their fellow employees by giving to the committee suggestions that are the result of practice and personal experience. The plan brings officer and employee close together, and theory and practice are joined.

The three district safety committees, under the leadership of the several general superintendents, consist of the immediate staffs of these officials. All suggestions originating on a division that would tend to enhance safety and that do not



Organization of the Safety Committees on the Southern Pacific.

Devices and practices that make for or against safety and economy in railway operation have been put to the test of the combined experience of both the officers who must administer, and the employee who must make these devices and practices a part of his work-a-day life. It is, doubtless, owing to these meetings that the Southern Pacific has a good accident record. Not a passenger has been killed or injured on it in nearly four years. These monthly division meetings, which were attended by employees at the request of the division superintendent, have now developed into permanent safety committees. The plan that was inaugurated on each of the ten divisions has spread upward (contrary to the usual method) to include the three general superintendents' districts, and from these even farther up to converge in the Central Safety Committee, composed of the vice-president, general manager, assistant chief engineer of maintenance of way, chief surgeon, general superintendent of motive power, general inspector of motive power department, and the general claims attorney.

involve an excessive expenditure or a change in standards, are disposed of at once by the division safety committee. If excessive expenditures or changes in standards are involved, the suggestion is transmitted to one of the district committees. If the question at issue is beyond the authority of this second body, it is then passed up for final disposition to the central safety committee.

Special records are kept segregating accidents carefully so the data may be of value as a means of indicating where greater stress should be laid to prevent accidents. In the shops and other service not having to do directly with the operation of trains, the basis of comparison is 1,000 man-hours. The special inspector, with a corps of assistants, devotes his entire time to safeguarding machinery.

Each member of a committee wears a safety button—a block signal with the outstretched arms of warning—and each, by this token, pledges himself, by precept and example, to inculcate the safety habit in his fellow workmen.

COMPARATIVE SERVICE TESTS OF LOCOMOTIVES.

Road Trials on the B., R. & P. to Determine the Efficiency
of the Automatic Stoker, Superheater and Brick Arch.

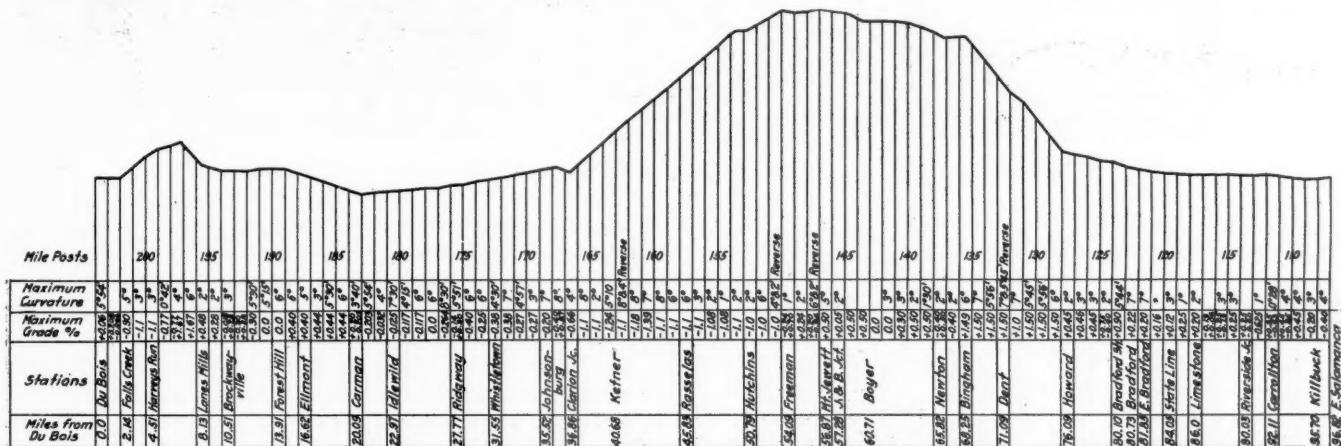
The Buffalo, Rochester & Pittsburgh has a locomotive of the 2-8-2 type fitted with the latest design of Street automatic stoker, which includes a conveyor in the tender. The same road has also applied at its Du Bois, Pa., shops, superheaters of the top header type, as well as Security brick arches to several locomotives of the 4-4-2 type, as well as to some of the 2-8-0 type. In addition, a recent order of Pacific type locomotives was fitted with superheaters and brick arches by the builders. It was thus in position to make comparative trials in road service of a 2-8-2 type locomotive stoker fired and hand fired, of both an Atlantic type and a consolidation locomotive without superheater or brick arch in comparison with identical locomotives fitted with both of these devices, as well as of Pacific type locomotives originally designed to include the superheater and brick arch. Such tests were made during the month of June with results which are given below.

In making the tests every precaution was taken to insure accuracy in connection with the coal and water consumption, weight of train, time, speed and distance. The coal in this and all the other tests was put up in 100 lb. sacks and the tank was fitted with gage glasses at diagonally opposite the corners and was accurately calibrated previous to the tests. A Hausshalter speed,

drivers, 200 lbs. of steam and a tractive effort of 52,730 lbs. was used between Clarion Junction and Freeman, a distance of 17½ miles. The weight of the pusher or helper engine is not included in either case, nor is the amount of work they did subtracted from the total of either road locomotive. The same pusher and helper engines were used at the same places in both tests.

There were five runs made with locomotive No. 400, on three of which the stoker was used. In the following table is given the weight of train and distance of each of these runs:

	No. cars.	Distance, miles.	Actual tons.
Run No. 1— (Stoker fired)	46	51.95	2,328
	59	27.74	3,224.7
	57	15	3,109.1
Run No. 2— (Stoker fired)	44	34.72	2,405.9
	42	17.23	2,330
	60	42.73	3,352.4
Run No. 3— (Stoker fired)	42	51.95	2,479.9
	59	14.16	3,365.3
	58	28.57	3,317.3
Run No. 4— (Hand fired)	44	34.72	2,505.5
	44	60	2,539.8
Run No. 5— (Hand fired)	49	34.72	2,357.5
	48	17.23	2,322.9
	64	42.73	3,209.5



Profile of That Part of the Buffalo, Rochester & Pittsburgh on Which Locomotive Tests Were Made.

time and distance indicator was installed in a special car which was included in the train. The trains were operated between Du Bois and Salamanca, a distance of 96.82 miles, the profile of which is shown in the accompanying illustration.

STOKER TESTS.

Mikado type locomotive No. 400, shown in one of the accompanying illustrations, has the following general dimensions:

Total weight	275,000 lbs.
Weight on drivers.....	217,000 lbs.
Tractive effort	51,160 lbs.
Cylinders, diameter and stroke.....	.26½ in. x 30 in.
Diameter of drivers .....	.63 in.
Steam pressure	180 lbs.
Heating surface, firebox	234 sq. ft.
Heating surface, tubes	3,391 sq. ft.
Heating surface, total	3,625 sq. ft.
Superheating surface	757 sq. ft.
Grate area	56.5 sq. ft.
Number and diameter of tubes .....	.240—2 in.
Length of tubes .....	.20 ft.
Number and diameter of flues	32—5½ in.
Diameter of boiler .....	.74 in.
Tender, coal capacity	15 tons
Tender, water capacity	9,000 gals.

A helper engine of the consolidation type with 21 in. x 28 in. cylinders, 57 in. drivers, 200 lbs. of steam, and a tractive effort of 56,827 lbs. assisted the trains between Falls Creek and McMinns Summit, a distance of about four miles. A pusher engine of the 2-10-0 type with 24 in. x 28 in. cylinders, 52 in.

These weights are actual weights of train behind the tender. The locomotive weighed 222 tons. The total ton mileage of the train together with the actual running time, the time on the road and the number of stops, is given below:

	Total ton mileage.	Running time.	Time on road.	Stops.
Run No. 1....	279,081.9	5.92 hrs.	8.8 hrs.	14
Run No. 2....	289,058.9	5.92 hrs.	7.7 hrs.	15
Run No. 3....	293,358.1	6.00 hrs.	7.8 hrs.	10
Run No. 4....	261,167.7	5.95 hrs.	7.75 hrs.	9
Run No. 5....	281,100.3	5.46 hrs.	7.63 hrs.	7

On runs No. 1 and 2 the fuel handled by the stoker was slack and nut about equally divided. The stoker handled this grade of coal very successfully, the rake being used but few times. On run No. 3 extremely fine slack was used. The coal banked badly at the back of the firebox and considerable raking and firing by hand was necessary. On the hardest pulls the steam pressure could not be maintained. On runs No. 4 and 5, which were hand fired, run of mine coal of excellent quality was used. In the following table is given the coal and water consumption for each of the runs.

	Coal per hr., lbs.	Coal per ton-mile, lbs.	Water per hr., lbs.	Water per ton-mile, lbs.
Run No. 1.....	2,235.7	.0702	13,106.7	.412
Run No. 2.....	2,220.7	.059	14,674.7	.391
Run No. 3.....	2,382	.063	15,253.3	.404
Run No. 4.....	1,922.6	.057	15,412.1	.457
Run No. 5.....	1,965.1	.053	15,098.8	.410

The poor results shown on run No. 1, was quite largely due to a break-in-two which delayed the train for 46 minutes at Bradford.

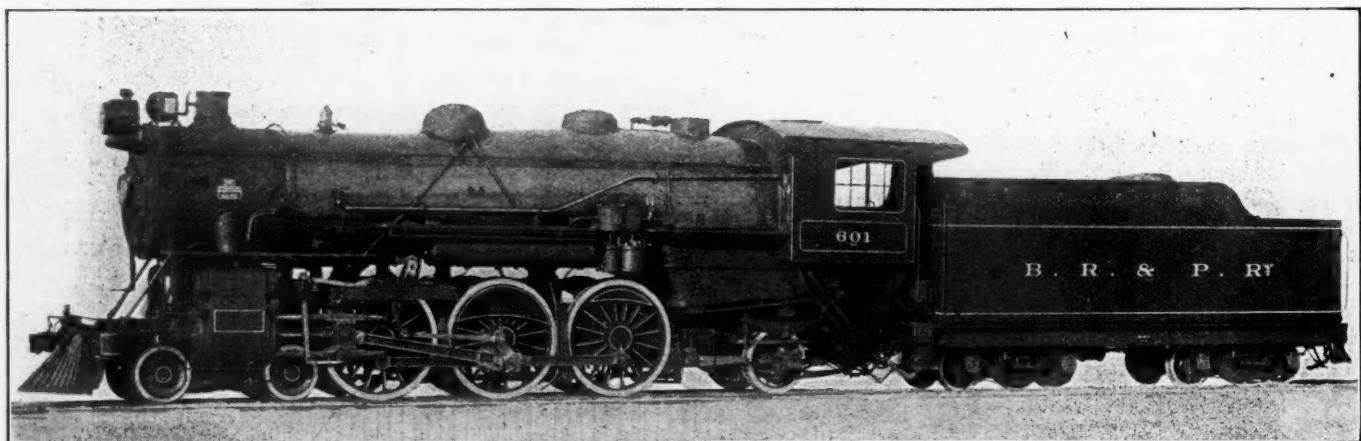
An average of the three stoker fired trips and two hand fired trips, together with the percentage difference, based on the average of the stoker runs as 100 per cent., is shown in the following table:

	Stoker fired.	Hand fired.	Difference, Per Cent.
Actual running time (hrs.).....	5.95	5.7	98.6
Ton mileage, cars.....	266,076	250,044	93.9
Ton mileage, total of train.....	287,166	271,134	94.4
Steam pressure average, lbs.....	167.67	171.65	102.4
Lbs. of coal, total.....	18,400	14,950	81.3
Lbs. of coal per 100 T. M. (in- cludes locomotive)	6.41	5.52	86.1
Lbs. of coal per sq. ft. of grate per hr.	40.34	34.40	85.3
Lbs. water per hr.....	14,345	15,255	106.4

three Pacific type locomotives built by the American Locomotive Company, which have the following general dimensions:

Total weight	258,000 lbs.
Weight on drivers	163,500 lbs.
Tractive effort	36,340 lbs.
Cylinders	24½ in. x 26 in.
Diameter of drivers	73 in.
Steam pressure	200 lbs.
Diameter of boiler	74 in.
Number and diameter of tubes.....	240—2 in.
Number and diameter of flues.....	32—5¾ in.
Length of tubes	20 ft.
Heating surface, firebox	234 sq. ft.
Heating surface, tubes.....	3,391 sq. ft.
Heating surface, total evaporative.....	3,625 sq. ft.
Heating surface, superheater	757 sq. ft.
Grate area	56.5 sq. ft.

Of the four runs, two were made with one locomotive and one each with the other two. In each case a distance of 96.82 miles was covered. The train consisted of six cars of which



Pacific Type Locomotive Tested on the Buffalo, Rochester & Pittsburgh.

Lbs. water per lb. of coal.....	6.29	7.85	124.8
Lbs. water per sq. ft. heating sur- face per hr.....	3.95	4.21	106.4
Lbs. water per 100 T. M. (in- cludes locomotive)	40.21	43.37	107.9
Lbs. water from and at 212 deg. per lb. coal.....	7.6	9.49	124.8
Lbs. water from and at 212 deg. per sq. ft. heating surface.....	4.77	5.09	106.6

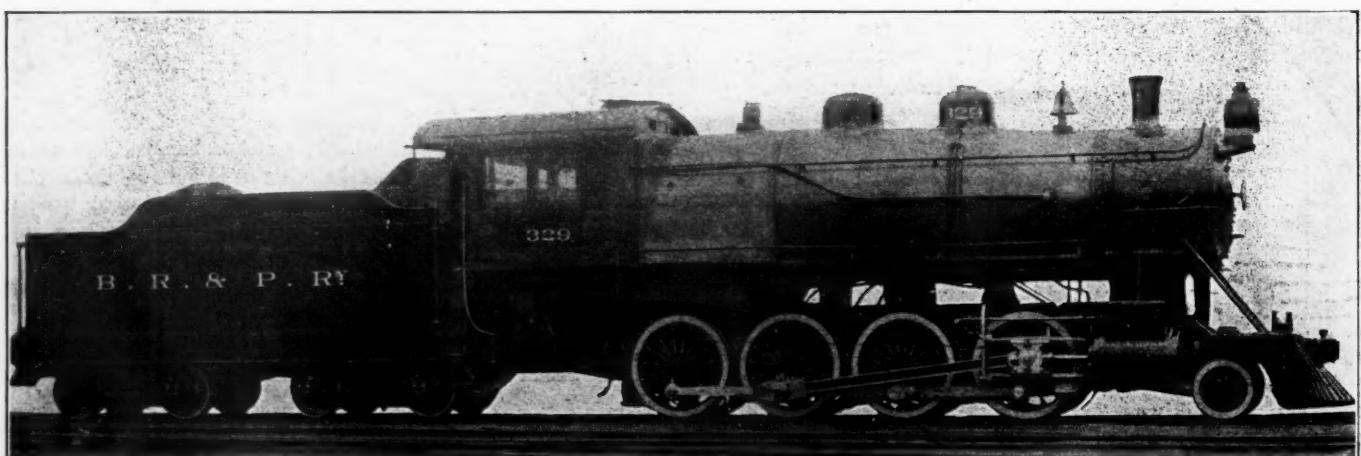
The speed curves show that on all the runs an average speed of over 15 miles per hour was maintained, and that frequently speeds of 30 miles per hour were reached for short intervals. At a few points the indicator showed nearly 40 miles an hour for about a minute.

SUPERHEATER AND BRICK ARCH TESTS.

There were three separate series of tests of the superheater and brick arch, two being comparative. The first series were on

four were coaches, one a cafe car, one baggage and one mail. The average weight of cars including passengers and lading was 286.5 tons. The locomotive weighed 214 tons, giving an average weight of total train of 500 tons. The coal in each case was an excellent grade of run of mine and the weather and rail conditions were good. On two trips there were five slow orders on account of work on road and bridges, on another one there were six and another nine slow orders. The schedule provides two hours and forty-eight minutes for this train and on each run there were from seven to eleven minutes made up, there being eight stops in three cases and nine on the fourth run.

These stops consumed from thirteen to fifteen and one-half minutes on each trip. The average speed of the four trips, actual running time, was 42.6 miles per hour. In the following table



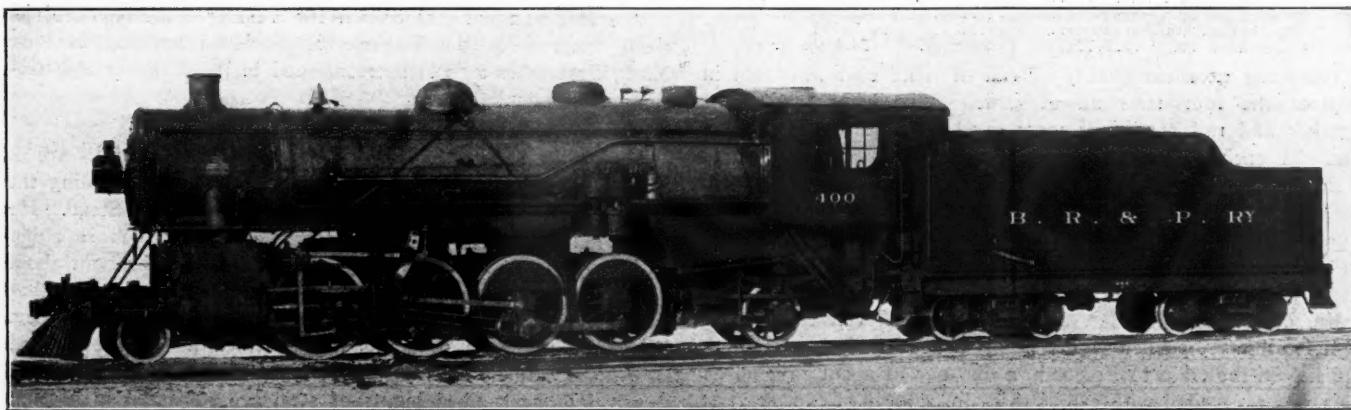
Consolidation Locomotive Tested in Road Service on the Buffalo, Rochester & Pittsburgh.

is given the coal and water consumption, average of the four trips for the three locomotives.

Length of run.....	96.82 miles
Actual running time.....	2 hrs. 27 min.
Number stops.....	8.25
Number slow orders.....	6.25
Ton mileage, cars.....	27,739 tons
Ton mileage, total.....	48,458 tons
Lbs. of coal used, total.....	6,275 lbs.
Lbs. of coal per 100 ton-miles (includes weight of locomotive).....	12.93
Lbs. of coal per 100 ton-miles (cars only).....	22.55
Lbs. of coal per sq. ft. grate area per hr.....	41.38
Lbs. of water used per hr.....	19,410
Lbs. of water per lb. of coal.....	8.385
Lbs. of water per sq. ft. evaporative heating surface per hr.....	5.35
Lbs. of water per 100 ton-miles (includes weight of locomotive).....	107.53
Lbs. of water from and at 212 deg. per lb. coal.....	10.14
Lbs. of water from and at 212 deg. per sq. ft. heating surface per hr.....	6.46

The speed curves show that speeds of 60 miles per hour were frequent for short distances.

The train is practically the same as that used in the tests of the 4-6-2 type locomotive, and had an average weight of 288 tons, including passengers and lading on the superheater tests and 289 tons on the saturated steam tests. The former locomotive weighed 189 tons as compared with 186 tons for the latter. The distance was 96.82 miles and the schedule allowed two hours and forty-eight minutes. The weather in each case was fair, wind light and rail good. On the first trip with the superheater locomotive there were ten slow orders in addition to nine stops and 4 min. 50 sec. were lost on the trip. On the second trip there were but five slow orders in addition to the nine stops and the run was made in three minutes less than schedule time. On the third trip, with the saturated steam engine, there were five slow orders and nine stops, and fifteen minutes were lost. On the fourth trip there were five slow orders and nine stops and three and a quarter minutes were lost. The coal in each case was an excellent grade of run of mine. The following



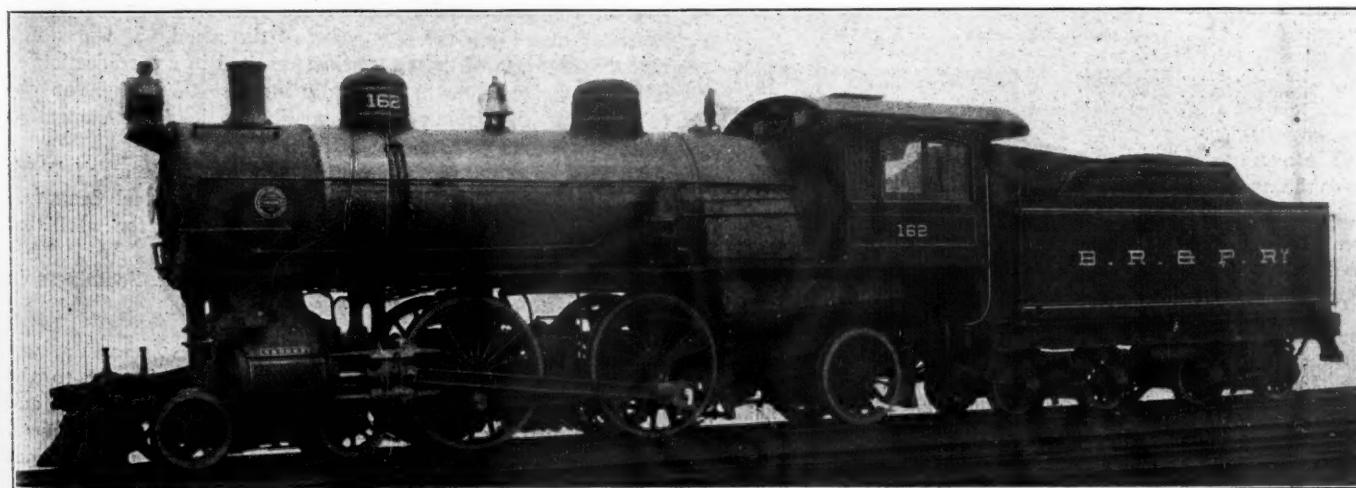
Mikado Locomotive Tested Both With and Without a Stoker on the Buffalo, Rochester & Pittsburgh.

Atlantic type locomotive No. 162 is of the same class as No. 163 and was fitted with a Security brick arch and Locomotive Superheater Company's type A superheater at the Du Bois shops. There were no other changes made in the locomotive. The alteration in the heating surface is shown in the following table of dimensions:

	Saturated.	Superheated.
Total weight.....	173,000 lbs.	183,000 lbs.
Weight on drivers.....	99,000 lbs.	113,700 lbs.
Size of cylinders.....	20 1/4 in. x 26 in.	20 1/4 in. x 26 in.
Diameters of drivers.....	72 in.	72 in.
Steam pressure.....	200 lbs.	200 lbs.
Tractive effort.....	25,173 lbs.	25,173 lbs.
Diameter of boiler.....	70 1/2 in.	70 1/2 in.
Heating surface, firebox.....	194 sq. ft.	221.1 sq. ft.
Heating surface, tubes.....	2,798.4 sq. ft.	2,157.4 sq. ft.
Heating surface, total.....	2,992.4 sq. ft.	2,378.5 sq. ft.
Superheater units.....	.....	26
Superheater heating surface.....	.....	480 sq. ft.
Grate area.....	54.4 sq. ft.	54.4 sq. ft.

table will permit a comparison of the coal and water consumption of the two locomotives. The percentage column is based on 100 per cent. for the superheater engine.

	Super-heated.	Saturated.	Per Cent.
Length of run, miles.....	96.82	96.82	100
Actual running time, hrs.....	2.5	2.63	105.3
Number of stops.....	9	9	100
Number of slow orders.....	8	5	62.5
Ton mileage (cars only).....	27,884	27,981	100.3
Ton mileage (including weight of locomotive).....	42,504	42,117	99.1
Lbs. of coal used, total.....	6,350	7,300	115
Lbs. coal per 100 ton-miles (including weight of locomotive).....	14.90	17.30	116.1
Lbs. of coal per sq. ft. of grate area per hr.....	41.44	45.60	110
Lbs. of water, total.....	49,090	59,552	121.3
Lbs. of water used per hr.....	17,451	20,208	115.8
Lbs. of water per lb. of coal.....	7.74	8.16	105.5
Lbs. of water per sq. ft. evap. heating surface per hr.....	7.33	6.75	92.1



Atlantic Type Passenger Locomotive with Brick Arch and Superheater on the Buffalo, Rochester & Pittsburgh.

	Super-heated.	Saturated.	Per Cent.
Lbs. water per 100 ton-miles (including weight of locomotive).....	115.51	141.38	122.4
Lbs. of water from and at 212 deg. per hr.	21,168	24,481	115.7
Lbs. of water from and at 212 deg. per lb. of coal.....	9.38	9.88	105.3
Lbs. of water from and at 212 deg. per sq. ft. heat. surface per hr.	8.88	8.17	92

Four runs were made with two consolidation locomotives which were identical with the exception that one was fitted with superheater and brick arch which had been applied at the company's shops. These locomotives have the following dimensions:

	Saturated.	Superheated.
Total weight	184,000 lbs.	194,000 lbs.
Weight on drivers.....	164,000 lbs.	173,500 lbs.
Cylinders, diam. and stroke.	21 in. x 28 in.	21 in. x 28 in.
Drivers, diameter	57 in.	57 in.
Steam pressure	200 lbs.	200 lbs.
Tractive effort	36,827 lbs.	36,827 lbs.
Diameter of boiler	70 in.	70 in.
Heating surface, firebox.....	190 sq. ft.	218.8 sq. ft.
Heating surface, tubes.....	2,672 sq. ft.	2,154.6 sq. ft.
Heating surface, total evap.	2,862 sq. ft.	2,373.4 sq. ft.
Heating surface, superheater .....	.....	460 sq. ft.
Superheater, number units..	.....	28
Grate area	54.4 sq. ft.	54.4 sq. ft.

The same excellent quality of run of mine coal was used in each of the four runs all of which were hand fired. The weather and rail conditions were good and the same for each run. In each case a helper was used from Falls Creek to McMinn's Summit, a distance of four miles. On the runs with the superheater locomotive this consisted of a consolidation locomotive with 21 in. x 28 in. cylinders, 57 in. drivers, and a tractive effort of 35,827 lbs. A larger helper was used on saturated steam tests, this consisted of a 22 in. x 28 in. consolidation with 56 in. drivers and 200 lbs. steam pressure. Its tractive effort is 41,140 lbs. A pusher engine was attached at Clarion Junction and helped the train to Freeman, a distance of about 17½ miles. This was a decapod with cylinders 24 in. x 28 in., 52 in. drivers, 200 lbs. steam pressure, and a tractive effort of 52,730 lbs. The same locomotive was used at the same places on each of the runs and no deduction is made for the work that either the helper or pusher did in handling the train, nor are their weights or coal consumption included in the results. The following table shows the train handled on each of the runs:

	No. cars.	Distance.	Weight of cars, tons.
Run 1— (Superheater)	38	51.95	2,202
	50	26.64	2,851.4
	49	16.09	2,784.6
Run 2— (Superheater)	46	51.95	2,020.4
	55	42.73	2,660.8
Run 3— (Saturated)	41	51.95	1,993.9
	52	42.73	2,536
Run 4— (Saturated)	37	6	1,962.3
	36	45.86	1,915.8
	47	42.73	2,612

The superheated locomotive weighed 159.5 tons, and the saturated steam locomotive weighed 153.95 tons, and in the following table is given the total ton mileage, the time and number of stops for each run.

	Total ton mileage.	Running time.	Time on road.	Stops.
Run No. 1....	251,197.9	6.4 hrs.	8.5 hrs.	10
Run No. 2....	234,627.7	6.1 hrs.	9.1 hrs.	15
Run No. 3....	227,353.5	6.95 hrs.	10.1 hrs.	19
Run No. 4....	226,841.9	6.4 hrs.	8.85 hrs.	16

The average of the two trips with the superheater locomotive and the two trips with the saturated engine give a coal and water consumption as is shown in the following table. The per cent. column is based on 100 per cent. for the superheater locomotive.

	Super-heated.	Saturated.	Per Cent.
Length of run (miles).....	95	95	...
Actual running time (hrs.).....	6.23	6.67	107
Number of stops	12.5	17.5	140
Ton mileage (cars only).....	227,760	212,472	93.3
Ton mileage (includes weight of locomotive)	242,913	227,098	93.5
Lbs. of coal (total).....	11,950	16,050	134
Lbs. of coal per 100 ton-miles of cars	5.25	7.5	142.9
Lbs. of coal per 100 ton-miles (includes weight of locomotive)...	4.89	7	143.3
Lbs. coal per sq. ft. of grate area per hr.	24.93	31.29	125.5
Lbs. of water (total).....	91,894	126,650	137.9

	Super-heated.	Saturated.	Per Cent.
Lbs. of water per hr.....	10,432	13,446	128.9
Lbs. of water per lb. coal.....	7.69	7.89	102.7
Lbs. of water per sq. ft. of evap. heating surface per hr.....	4.39	4.69	106.8
Lbs. of water per 100 ton-miles (includes weight of locomotive)	37.85	55.77	147.3
Lbs. of water from and at 212 deg. per lb. of coal.....	9.30	9.52	102.4
Lbs. of water from and at 212 deg. per sq. ft. evap. heating surface per hr.	5.31	5.65	106.5

The result of these tests very clearly shows the advantage of the superheater and brick arch for both passenger and freight service and the Buffalo, Rochester & Pittsburgh is now engaged in equipping other locomotives with this apparatus as rapidly as possible.

INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS.

The International Association for Testing Materials held its sixth congress in the Engineering Societies building in New York, September 3 to 7, as mentioned in the *Railway Age Gazette* of September 6.

PAPERS ON RAILS.

Among the papers presented, a group of seven on rails are of direct interest to railway men. The first was on "Welding the Blow-Holes and Cavities in Steel Ingots" by J. C. Stead. He attributed blow-holes to the presence of gas, which is either initially present or is formed by chemical reaction brought about by a fall of temperature. He outlined tests which showed that an ingot known to contain blow-holes, on reheating to 2,000 deg. F. proved to be as sound as ingots which had not contained blow-holes, and he concluded that under the ordinary treatment to which honeycombed ingots of steel are subjected in heating and rolling, internal cavities or blow-holes are perfectly welded providing there is an absence of sulphide segregations.

The paper by A. Mesnager on "Means of Foreseeing Ruptures of Rails" described a method of inspection practically amounting to polishing and examining microscopically; a process which was criticised as being impossible of practical application.

J. P. Snow read a paper on "Some Features of the American Steel Rail Situation," in which he commented on the development in rail sections, and of the tendency towards the more general use of open hearth metal.

In his paper on "Some Features Associated with the Test of Steel Rails," James E. Howard repeated a suggestion which he has previously made regarding the cold rolling of rail heads. He also suggested as a means of detecting slag laminations, a test in which the base of the rail would be bent in a crosswise direction.

P. H. Dudley, in his paper on "Testing Rails for Elongation and Ductility of the Metal Under the Drop Testing Machine," gave a brief resume of a series of tests made under mill conditions for measuring the elongation of the metal. It was stated that the adoption of these tests had resulted in a modification of mill practice, which will materially increase the elongation obtainable and that it has proved possible to hold the elongation within the limits of 18 to 20 per cent.

M. H. Wickhorst, in a paper on "American Research Work on Rails Conducted Jointly by Railways and Steel Manufacturers," reviewed railway and mill conditions and the work that is being done to secure better rails.

The paper by Robert W. Hunt, on "Insuring Soundness in Steel Rails," is published elsewhere in this issue.

HARDNESS TESTING AND WEAR.

That feature which was brought most prominently to the front in section A was the structural peculiarities of metals and the effect of these peculiarities on the service to which the metal was to be devoted. This keynote was struck in the first paper presented on "Hardness Testing and Resistance to Mechanical Wear," by E. H. Saniter, which showed that while a high Brinell number for hardness may be expected to give better

wear than a lower one, there are so many exceptions that its use for the purpose of indicating wearing properties is unreliable as far as the methods of wear testing reviewed are concerned. The relation of either Brinell tests or wear tests to wear in actual practice requires investigation. The greater reliability of the wear test as an indicator of wear is emphasized by the test on Hadfield's manganese steel which gives, with a low Brinell number, the best wear number of all the steels tested.

TESTS OF WEAR OF STEELS.

Felix Robin, in a paper on this subject, showed that in the case of annealed carbon steels the wear is not proportional to the contents in pearlite and that increased fineness of the particles, cold work and the presence of phosphorus increase the resistance to abrasion; the presence of silicon and manganese diminish it frequently. In cast metal the resistance grows with the phosphorus contents and with the percentage of iron carbide. The hardened steels can hardly be distinguished by this process; on the contrary, tempered steels lend themselves to this examination without any difficulty. The best resistance in hardened steels seems to be characteristic of the finest martensites. Chromium increases the resistance of annealed steels noticeably; it has little effect on hardened steels.

HARDNESS OF STEEL.

Captain C. Grard, in a paper on "Research on the Hardness of Steel," proposed to substitute a hardness test with the Brinell ball for the ordinary tensile tests. He maintained that if we multiply the Brinell number by a coefficient that can be obtained the result will be the tensile strength of the metal and that this coefficient undergoes but little variation in the different kinds of carbon steel.

This fact can experimentally be verified in the ordinary way. It is of interest because it admits of simplifying tests. It will suffice to measure the diameter of the ball impression, to deduce the hardness figure from this impression, and finally to multiply this hardness number by the coefficient of proportionality in order to arrive at the tensile strength. These operations are simple and they dispense with the necessity for the always laborious preparation of test specimens. But the coefficient of proportionality is not absolutely constant. It undergoes slight variations with different grades of steel, variations which will be interesting to enquire into.

TESTING STEEL TUBES.

A new method of testing steel tubes was suggested by C. Fremont, who said that in welded tubes a certain amount of overlap at the joint must be insisted on. In connection with tests on welds, he has shown that, even in the best welds, there is only a kind of adhesion, of very feeble strength, which explains the numerous cases of fracture of steam pipes through the weld giving way. He had found that the overlap in certain steam pipes was equal to fifteen times the thickness of the metal, whilst in other cases the two edges were simply held together by a butt-joint weld without any overlap at all.

In all pipes whose accidental breakage may form a source of danger, no information on the strength of the metal is afforded by static tests (tensile tests, distension, bending, crushing, etc.). For instance, a steel pipe, which successfully passed various static tests, proved extremely brittle under the impact test on nicked test pieces, the latter breaking under a moderate force and without any deformation of the metal.

Viewed in the microscope, under a low power, 50 diameters, for instance, a polished section of the tube was found to be contaminated throughout with impurities which were revealed more clearly when etched with iodine. It is well known that such impurities may contribute toward rendering the metal brittle; and moreover they are also the cause of pustular corrosion, especially when the metal is in contact with a material that possesses more or less oxidizing properties, such as feed water. Hence steel containing these impurities should not be used for making the various parts of boilers, collecting pipes, tubes, shells, etc.

If these impurities are distributed in the metal in such a manner that they accumulate very close to the surface, oxidation penetrates into the deeper regions, and the metal is then pitted in the form of galleries.

For testing a steel tube, Mr. Fremont cut off a ring 8 mm. broad, from each end. Each of these rings is examined under the microscope for the presence of piping or of impurities large enough to produce pustular corrosion; and also, in the case of welded tubes, to verify the apparent quality and amount of overlap of the weld. Then, each ring found to be good under this preliminary examination is flattened and doubled into U-section test pieces—this shape being given them to ensure sufficient stability under the impact test—and are cut off, either with the saw or with the shears, this cold working at the ends having no effect on the portion tested. The doubled test piece, about 35 mm. in length, is nicked on both limbs of the U by a saw cut, 1 mm. long and 1 mm. deep, and subjected to the impact test. The force required to break the test piece should not be less, for instance, than 745 foot pounds per square inch of the initial sectional area at the break.

WELDING STEEL.

Max Bermann read a paper on "The Nature of Welding Different Kinds of Steel and its Practical Application," from which he drew the following conclusion:

Summary and Practical Rules.—The perfect union of pieces of steel by welding is possible in the solid condition, but it is rarely realizable and can only be attained with certainty when the "Komm" method* is applied.

The crust of oxides which prevents the complete union of the smallest particles on the surfaces is rendered metallically pure and freed of its oxygen by the reducing action of the steel, and the cohesional union is thus facilitated.

The reduction of this crust of oxide proceeds all the more rapidly, the higher the temperature of welding and the greater the relative proportion of the reducing elements present in the steel.

The welding temperature is the highest temperature at which the weldable steel remains malleable.

The pressure which is required to effect cohesional union of the surfaces is relatively small at the welding temperature, but it must be sufficient to effect a very slight deformation at the seam and should be applied in accordance. The weld will be perfect when the parts united will not separate along the seam under alternating torsion or bending though continued until fracture ensues, but stronger pressure should be enacted and should be of the force when they break across like solid whole masses. If, however, the seams separate under stress as indicated, and if these surfaces are free from slags and cinders, the weld must be regarded as practically successful, because such a weld will successfully bear tension or bending if in one direction only.

Results of Importance for Practice.—The weldability of the steel is determined by heating it up to sparking white glow and by hammering it immediately afterwards. When the steel remains malleable at this heat, it will also be good for welding.

The heating of the pieces which are to be welded should take place in an oxidizing flame; otherwise the steel will take up carbon from the coal in the hearth and be converted into a non-welding modification.

The areas of the surfaces in contact should be made as large as possible. It is also recommended to shape the ends like wedges fitting into one another, and to take care to effect intimate contact of all the points on both sides of the wedges.

When an intimate contact between the two surfaces has been provided before heating up to welding temperature, even a rela-

*The union of the two pieces is produced within the fire, where the two conically pointed ends are in contact. The crust of cinders is removed by blows applied to the butts which project from the hearth, and since the two surfaces which are thus kept pure cling to one another at once and unite, there is no opportunity for a renewed oxidation. Rods which are welded in this way do not separate under alternating torsional bending along the faces welded, but they break across the axis of the rod, just like rods which have not been welded.

tively large crust of cinders will not prevent the realization of a good weld, provided the steel be itself readily weldable.

The pressure which is required to bring the two surfaces into good contact should be directed towards the center of the faces. It should only penetrate up to the middle and then be directed towards the marginal zone in order to facilitate the ejection of the slag. When the surfaces have begun to stick together, a suitable pressure should be applied, which is used in forging pieces of corresponding dimensions.

The test of the soundness of a weld by alternating torsion or bending at ordinary temperature should mainly be applied when it is a question of passing weldable steels in acceptance tests.

The reagents to be used for the welding of steels which are not themselves weldable consist particularly of materials which form slags and of iron turnings, also of very thin wires; they help to bring about a union between the faces and to dissolve the oxides. These particles of iron should, however, be applied in a very finely distributed state; otherwise they will be more injurious than useful, because they will interfere with the squeezing out of the slag.

Summary.—The author arrives at the conclusion that the presence of manganese is favorable for the success of the welding, because the manganese reduces the crust of oxides.

RAILWAY CAPITALIZATION AND TRAFFIC.

BY H. T. NEWCOMB,

Of the Bar of the District of Columbia.

Economic science recognizes two general classes of commodities, which are, first, those like food and clothing, directly capable of satisfying human wants, and, second, those, like flour mills and sewing machines, useful in the production of commodities of the first sort. Commodities of the second class, being unsuited for direct consumption, or segregated from the mass of goods intended for direct consumption, and devoted to the production of other goods become, by reason of the use to which they are put, capital. Labor may be devoted to the production of the one class of commodities or the other; if to the first class it is directly productive, if to the second class it is indirectly productive. Obviously the only sound reason for the indirectly productive employment of labor that could exist would be that in consequence of such employment the sum of commodities capable of directly satisfying human wants finally produced by a given expenditure of effort is augmented. Indirect production, as it involves the use of capital, that is of tools, machinery, etc., is capitalistic production.

Under modern methods of industrial association all production has become capitalistic in greater or less degree; that is to say, there is left no vestige of methods so crude that the final directly productive effort is not lightened by the utilization of the results of some indirectly productive labor that has gone before. In other words, even the poorest laborer uses some tool or tools; there are no remaining processes of producing articles to satisfy human needs that do not make some use of capital. The industrial marvels of the nineteenth and twentieth centuries, those triumphs of the arts of peace which have enabled Europe and America to support vastly multiplied masses of population and give to each individual of those masses opportunities for comfort far beyond those enjoyed by the most fortunate of their predecessors, are the specific results of the progressively increasing use of the capitalistic method of production. The productivity of human energy as expressed by the production of goods for direct consumption, has expanded in a ratio far beyond the possibility of admeasurement, because an increasing share of human labor has been devoted, not to the direct, but to the indirect, production of such goods. For example, labor of one man, devoted to the production of textile machinery, in its ultimate result, produces more clothing than the labor of a thousand men expended for the same final result, but compelled to work without machinery. Every tool or ma-

chine, that is to say, every result of indirectly productive labor is capital and its efficiency is measured by the amount of direct labor with which it dispenses. In other words, the efficiency of capital is in inverse ratio to the quantity of labor required to produce a given volume of output by its operation.

Transportation is a productive service of the most fundamental character, and an essential part of every productive process. It is a commodity, and like other commodities may be produced by the use of capital or, crudely and in very limited quantities, by labor alone. And the processes of producing transportation, like those of producing other commodities, have become increasingly efficient as more and more capital has been devoted to them. American railways carry a ton of freight one mile, on the average, for about three-fourths of one cent, and this sum, so small that the ton must be carried two hundred miles to pay \$1.50 for the day's work of the most unskilled laborer, must suffice to pay all the labor, much of it most highly skilled, that is necessary, and to afford a fair return upon all the capital employed. Also, the American railways, in the fiscal year 1910, the latest for which official data are available, carried 255,016,910,451 tons of freight and 32,338,496,329 passengers one mile. These enormous aggregates must be reduced to averages to be comprehended at all. The averages per capita of population and per railway employee are:

	Tons of freight carried one mile.	Passengers carried one mile
Per capita of population.....	2,773	352
Per railway employee.....	150,061	19,029

A consciousness which comprehends the fact that 2,773 tons of freight were moved one mile by American railways in 1910 for each man, woman and child of the country's population can, perhaps, contrast with that result, accomplished by this capitalistic process, the capacity of the strongest man to move the heaviest load of which he is capable, and from this contrast, vaguely imagine the state of industry and civilization that would remain if this method of capitalistic production suddenly became unavailable. Or, in imagination, the results of the existing method may be contrasted with the cruder capitalistic processes of transportation which the railways have supplemented and superseded—for the wheelbarrow, the horse and wagon and the highway are each capital. The railway itself has not failed to progress in efficiency—its efficiency when introduced was high only with relation to the means of transportation which preceded it; its growth in efficiency has been by the progressive measure in which it has enabled capital to take over a steadily increasing share of the tasks formerly devolved upon labor alone. From 1880 to the present time this progress can be read in the official statistics. Note the following.

Year.	Number of railway employees.	Number of tons of freight carried one mile.	
		Total.	Per employee.
1880.....	418,957	32,348,846,693	77,213
1890.....	749,301	76,207,047,298	101,704
1900.....	1,017,653	141,596,551,161	139,140
1910.....	1,699,420	255,016,910,451	150,061

No account is taken in the foregoing of the additional services performed in the transportation of persons, which have also increased greatly both in their total volume and in the average per employee. For present purposes it is, however, unnecessary to complicate the calculations by extending them to include passenger services which may not improperly be regarded as a bye-product incidental to the principal services which are those rendered in the transportation of property. If the higher productivity of labor, secured by throwing an increasing share of the work upon capital, had not changed the ratio of ton-mileage to number of employees, as compared with 1880, the number of employees required by the traffic movement of 1910 would have been 3,302,772 instead of 1,699,420; if such productivity had been no greater in 1910 than in 1890 the number of employees in the later year would have been 2,507,442; if no greater than 1900 it would have been 1,832,808. These figures demonstrate the augmented efficiency of the American railway as a machine for the production of transportation or, expressed

differently, that, as compared with its typical predecessor of 1880, 1890 or 1900 it is, today, of so much greater utility that it now enables the labor of one hundred men to accomplish what required the labor of 108 men in 1900, of 148 men in 1890, and of 194 in 1880. It ought further to be noted that these figures have no necessary relation to the quality of the labor employed or the labor services rendered, and afford no answer to any inquiry concerning either. If it may be assumed that such quality has neither deteriorated nor improved they plainly measure the results of improved machinery and organization. That assumption, is, perhaps, sufficiently warranted to be accepted at least for the purpose of the discussion that follows. Whoever objects to it can apply such modification as he may deem to be reasonable.

It is customary to measure capital in terms of money, the standard of value, and hence the customary expression for a particular quantity of capital is its equivalent in money. But value is the current ratio at which commodities exchange for one another, and as these ratios fluctuate widely from time to time, comparisons based upon a long period may become highly deceptive on account of wholly unrelated and extraneous conditions. This is the case, if an attempt is made to compare the capital invested in American railways in 1880 with the amount now invested. The variable value standard has been so modified during this period, by economic changes, many of which were external to the matters under investigation that, if the attempt is made to relate capital thus measured to the amount of work done at the end of successive decades the resulting averages afford no suggestion of the increased utility of the unit of capital, this increase being concealed by (1) increased efficiency of railway organization, and (2) decreased cost of the separate units of the constructed plant and equipment, i. e., rails, locomotives, etc., making up the railway machine. That is to say, as compared with 1880, the railway tool of 1910 is more efficiently manipulated, and, reduced to comparable standards, costs less. The following table, comparing net railway capitalization with the work done in the transportation of freight shows what has happened.

Year.	Net capitalization.		
	Number of tons of freight carried one mile.	Average per ton of freight carried one mile, in cents.	Total.
1880.....	32,348,846,693	\$5,081,922,428	15.71
1890.....	76,207,047,298	8,030,436,419	10.54
1900.....	141,596,551,161	9,547,984,611	6.74
1910.....	255,016,910,451	14,338,575,940	5.62

The foregoing shows that for each ton of freight carried one mile in 1880 there was a capital investment, measured by the net capitalization, which is at least sufficiently accurate for the purposes of this paper, of 15.71 cents, and that by 1910 this had been reduced 64.23 per cent. to 5.62 cents. These ratios prove that the productivity of capital, according to the ordinary standard of measurement, as well as the productivity of labor has been multiplied, and suggest that during most, if not all, of the period the railway industry must have been in that state of conformity to the economic law of increasing returns during which additional "doses" of capital or labor or both, applied under capable management, give better results, in the form of a higher average ratio of volume of output to capital or labor employed, than could be obtained before. It is well understood, however, that this state cannot remain the permanent condition of any industry, and that at some stage or other of its development it must pass into the state of constant returns which will soon be followed, if continued expansion takes place, by the final state of diminishing returns. In this state it may still be possible to cheapen the average cost of output by substituting lower capital expenses for higher labor costs, but it will no longer be practicable to augment both investment and labor and to show a resultingly higher factor of efficiency for both.

In the April, 1912, issue of *Moody's Magazine* there appears an article written by W. Martin Swift and entitled, "Railroad Operating Expenses," which is very suggestive along these lines. Mr. Swift's article is, in effect and so far as its data and con-

clusions are accurate and sound, a marshalling of evidence which tends to prove, first, that the railway industry of the United States, as an whole, is now subject to the law of diminishing returns; second, that the decline in the value of the separable units of its necessary physical property stopped some time ago, and, third, that of late it has been forced to purchase increased productivity of labor by greater investments of capital of relatively lower productivity than the average formerly attained by the smaller former investments. It must be noted that so long as the loss in average productivity of capital is less than the gain from the increased productivity of labor this process has complete economic justification. And it must further be noted that for the purpose of determining whether such justification exists all values of capital goods and all rates of wages must be reduced to comparable terms as the real question is whether day by day, under current operating conditions, the additional investment is justified. The computation is, perhaps, easier of comprehension than a statement of the principle. It might run like this: an additional capital investment costing, for interest and maintenance of property, \$1,000,000 annually ought to be made if by making it total operating expenses, which are principally labor costs, at current rates of wages, can be reduced much more than \$1,000,000 per annum.

Mr. Swift uses the term of somewhat sinister suggestion, "over-capitalization," but any reader of his article perceives at once that he does not use it in the harsh and ordinary sense, but only as referring to the condition already described, in which more capital is necessary to produce an added volume of transportation than would be required if the average productivity of capital of the past could be maintained. This article has already shown that this productivity was maintained and greatly increased, from 1880 to 1910, but the figures used by Mr. Swift indicate that the process had been reversed before the end of the period, and disregarding his statistics, which it has been found impossible in some cases to substantiate, this one of his conclusions is apparently sound.

Referring to the last foregoing table it will be noted that beginning with a capital investment of 15.71 cents per annual ton-mile in 1880 there was a rapid decline to 10.54 cents in 1890 and 6.74 cents in 1900 and that the slight decrease of the last decade carried the average of 1910 to 5.62 cents. Thus there was a decrease of 5.17 cents, or 32.91 per cent., in the first decade, one of 3.80 cents, or 36.05 per cent. in the second decade and one of 1.12 cents, or 16.62 per cent. in the third and last decade.

A closer examination of the official data for the last decade shows that from 1901 to 1910 the productivity of railway labor has increased with substantial regularity but that the productivity of capital, considered alone and irrespective of its ability to advance the productivity of labor, has fluctuated and that, allowing for changes that are plainly due to the peculiar traffic conditions of different years, it has decreased during the last half of the period. These facts are made apparent by a close study of the following table, the basic data in which are from successive reports of the Interstate Commerce Commission, although a clearer presentation can be made, and will be offered hereinafter, by using two-year averages and thus avoiding some of the unrelated variations that result from using annual figures:

Year.	Number of tons of freight carried one mile.		Net capitalization.	
	Number of employees.	Total.	Average per employee.	Total.
1901...	1,071,169	147,077,136,040	137,305	\$9,482,649,182
1902...	1,189,315	157,289,370,053	132,252	9,925,664,171
1903...	1,312,537	173,221,278,993	131,974	10,281,598,305
1904...	1,296,121	174,522,089,577	134,650	10,711,794,078
1905...	1,382,196	186,463,109,510	134,904	11,167,105,992
1906...	1,521,355	215,877,551,241	141,898	11,671,940,649
1907...	1,672,074	236,601,390,103	141,502	12,252,766,079*
1908...	1,436,275	218,381,554,802	152,047	12,833,591,510
1909...	1,502,823	218,802,986,929	145,595	13,711,867,733
1910...	1,699,420	255,016,910,451	150,061	14,338,575,940

* Not given by the Interstate Commerce Commission—obtained by assuming that the increase from 1906 to 1907 was one-half of the increase shown by the Commission for the years 1906 to 1908.

The foregoing shows that the highest productivity of capital was attained in 1907 when the investment per ton-mile was but 5.18 cents, while the years 1908, 1909 and 1910 show lower efficiency than any year since 1905. These facts are in substantial agreement with Mr. Swift's conclusion on this point. Using two-years averages, some of the yearly fluctuations are avoided and the demonstration is rendered somewhat clearer. The capital investments for successive two-years periods thus disclosed follow.

Period.	Average capital investment per ton of freight moved one mile.
1901-2	6.38 cents
1903-4	6.04 cents
1905-6	5.68 cents
1907-8	5.51 cents
1909-10	5.92 cents

Or, if three-year averages are used the decline during the last six years for which official data are available was from the productivity of capital represented by an average investment of 5.49 cents per ton of freight carried one mile during the years 1905 to 1907, inclusive, to that represented by 5.91 cents for the years 1908 to 1910.

So far the measurements of productivity that have been used have been based upon the volume of the annual output of freight transportation, but similar averages can be made in which earning power is substituted for volume of traffic as the basis of admeasurement. This method would be less satisfactory if covering a period of rapidly declining rates, like that of the years 1880 to 1900, but has the advantage of including all classes of traffic and may be used with fairly accurate results with reference to the period subsequent to the year 1900, as since then the decline in railway charges has been small. The following table presents such figures by two-year periods.

Period.	Gross receipts from operations for entire period.	Average gross receipts per employee.	Average net capitalization per \$100 of annual gross receipts.
1901-2	\$3,314,906,304	\$1,466	\$5.85
1903-4	3,876,020,998	1,486	5.42
1905-6	4,408,247,573	1,518	5.18
1907-8	4,982,911,567	1,603	5.03
1909-10	5,169,344,973	1,614	5.43

The foregoing shows results substantially identical with those obtained when the comparisons were based on ton-mileage. The gross earning power per employee appears to have increased somewhat steadily, and the gross earning power of capital increased during the earlier portion of the period, but during its later portion the latter decreased so rapidly that in 1909-10 it required \$5.43 of capital to produce \$1 of gross receipts as compared with \$5.03 in 1907-8, \$5.18 in 1905-6 and \$5.42 in 1903-4.

These data are believed to disclose a changed condition which will permanently control the future development of the American railway system and its financial and operating methods. Higher productivity of labor will continue to be desirable, to be sought and to be possible, but it can be obtained only at the cost of investments of capital that will be disproportionate to past investments and that will show decreasing ratios of return, when measured by the volume of the transportation or, unless rates are advanced, by the revenue produced. And, further, the necessity of continuing the process of substituting the productivity of capital for the productivity of labor will remain and will steadily increase, as it has notably increased in the recent past, especially if the constantly upward progress of railway wages is not interrupted. This conclusion is inevitable and its implications are necessarily of a character which calls for serious consideration on the part of those who have power to influence in any degree the future attitude of the federal and state governments toward the railway industry. They afford additional evidence of the truth that the future of American railways and the industries dependent upon the services by them rendered, will be determined by the willingness of the investing public to supply the funds necessary to permit the increases and improvements in railway facilities which the future economic welfare of the nation demands. Hon. Charles

A. Prouty, Chairman of the Interstate Commerce Commission, in an address delivered at Yale University in 1909, said:

"While we can provide by legislation the sort of cars which a railroad shall use and the rates which it shall impose, we cannot by legislation force one single dollar of private capital into railway investment against its will."

This excerpt expresses a great truth, but by no means all of the truth. The needed capital which may not be forced into the field of railway investments by legislation can be attracted or repelled, and will be attracted or repelled as the public policy in dealing with that industry is wise or the reverse. Potential investors have, during recent years, looked with little favor upon regulative proposals that have been urged with great vigor and although the most obnoxious of these have not been adopted there has been a strong inclination to tighten pursestrings or to seek other forms of investment until unrest and agitation cease. The great sums needed in order that the industries of the country may properly and adequately be served can be obtained upon favorable terms whenever the investing public is assured of the renewed stability of conditions. If the general public will recognize the extent of these capital requirements and the imperative character as well of such demands upon capital as are suggested by this article there need be no doubt that the unwisdom of discouraging such investments by excessive, irritating and hampering regulative legislation will be perceived and that wise and conservative counsels will prevail.

PROPOSED CHANGES IN M. C. B. INTER-CHANGE RULES.

A special letter ballot is being taken by the Master Car Builders' Association on propositions for changes in the M. C. B. Rules of Interchange to abrogate the rules which penalize the delivering line for owner's defects and to add a direct percentage of 10 per cent. to the total labor and material charges as shown on the monthly bills. Both propositions were recommended by the arbitration committee of the association and were approved in resolutions adopted by the executive committee at a meeting in Chicago on September 4, as briefly noted in last week's issue. They are both intended to avoid delays to the free movement of traffic at interchange points.

The M. C. B. rules now provide that certain defects are owner's defects when repairs are being made by the handling company, but become delivering line defects when a car is offered in interchange. The arbitration committee said in its resolution that the necessity for carding such defects in interchange seriously interferes with the interchange movement without promoting safety. The circular relating to the ballot states, that at the meeting of the executive committee, "it was the unanimous opinion that carding such defects in interchange did not promote the safe movement of the car inasmuch as the car was received with the defects as carded for and even though the card was applied it was still necessary for the receiving line to inspect the car and decide whether the car was safe for movement. It was also the unanimous opinion of your committee from the results obtained and the data submitted from the large interchange terminals that the penalty clause of the M. C. B. Rules of Interchange did not promote freight car maintenance. If, therefore, the application of cards to cars in interchange for such defects does not promote the safe movement of the car nor act as an incentive to freight car maintenance, the delay to traffic in interchange on this account is not warranted. The general feeling is that a defect which is a car owner's defect should not only be regarded as such when the car is in the possession of the handling company, but also should be regarded as such when the car is in interchange. We feel that there is no injustice to the car owner in this view, and it will furnish the necessary relief and promote the free movement of traffic in interchange without the necessity of entering into any further

local agreements, or any further modification of the M. C. B. Rules."

In its resolution recommending an increase in the repair allowance, the arbitration committee says:

"We believe it is a generally acknowledged fact that freight cars are not being maintained in a condition of repair so as to insure a safe condition of the car, together with the best service and the most profitable use obtainable from the equipment. Therefore, it is the consensus of opinion of this committee that something must be done to stimulate thorough maintaining of cars on foreign lines as well as those at home, and it is believed that this will best be accomplished by making the work profitable to those companies which perform the repairs."

In further explanation of its recommendation, the committee states that there has been general complaint in reference to the condition of cars received in interchange. There has also been an increase in the number of cars held out of service on account of being in bad order. The situation has become so serious that a conservative estimate of the cars out of service on account of being in bad order will place the number at least 7 per cent. of the total freight cars in the country. It is admitted that the labor and material prices authorized by the M. C. B. Rules do not generally permit the work to be done at cost, and consequently, foreign cars, instead of being repaired by the handling company, are forwarded home under card. It is felt that if such an increase in the M. C. B. repair allowance were allowed as will permit the road doing the work to at least obtain compensation for the cost of doing it, it would prove an incentive to the maintenance of foreign cars. It is further to be noted, the committee says, that in the M. C. B. prices no allowance is made to cover the cost of facilities and tools. An increase to cover these matters may be made, either by increasing the labor rate per hour, by increasing the prices to be charged for the materials, or by adding a direct percentage to the total labor and materials as shown on the monthly bills. The committee feels that if the resolution is approved the tendency would be towards better freight car maintenance, and further feels that the simplest method of applying such increase would be to add a percentage to the labor and material as shown on the monthly bills.

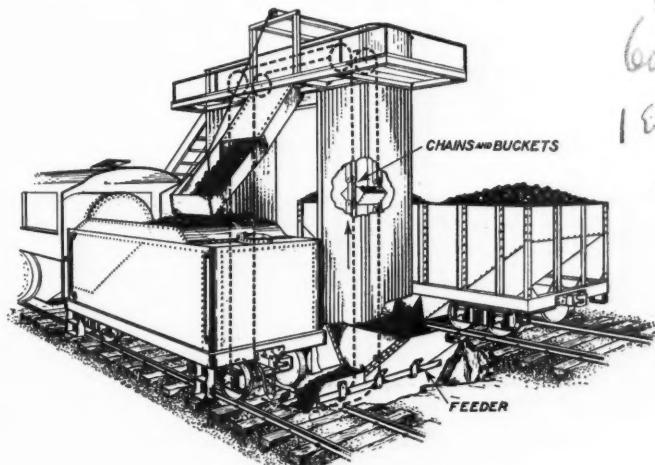
The votes will be counted on Saturday, September 28. A two-thirds majority is required to carry the propositions.

GOVERNMENT OPERATION IN ARGENTINA.—The government of the province of Entre Ríos, Argentina, has applied to the federal government for permission to raise a loan of \$6,250,000, to be devoted to the construction of light railways in parts of the province not yet provided with railway facilities, and also for the construction of lines in districts now served by existing systems. From past experience of the failure of the provinces to operate railways constructed under their respective administrations on a profitable basis, it is thought that it would be more advantageous to the development of the republic if the authorities were to divert their energies to improving the highways and to leave the railway projects to private enterprise. As an example, it may be cited that about twenty years ago the province of Entre Ríos owned and operated part of the system which now belongs to the Entre Ríos Railways. Similarly, the Santa Fé province owned and operated some of the railways now belonging to the French railway company, and the province of Buenos Ayres owned the Western Railway, which is now in the hands of an English company. Under the administration of the provinces, all the lines mentioned above were operated at a loss, and eventually had to be handed over to private capitalists. In spite of this the province of Buenos Ayres again dabbled in railway schemes, and constructed the La Plata-Meridian 5 Railway. That line is now being operated at a loss. It is calculated that sooner or later it will have to be handed over to private enterprise or continue to be operated at a loss by the Argentine government.

SMALL CAPACITY COALING STATION.

A small capacity coaling station of low initial cost and of a compact nature has been designed by the Link-Belt Company, Chicago. It is for use, primarily, at small stations where it is necessary for engines to be coaled and the expense of an ordinary coaling station is not warranted. As shown in the illustration, the station is placed between two tracks, one of which is used by a storage car, and the other by the engine to be coaled. The structure is made of steel and occupies a space 6 ft. x 16 ft. The coal is taken directly from a hopper car which dumps into a steel hopper underneath the track. This hopper is provided with a reciprocating feeder which delivers the coal at a uniform rate to a line of chain buckets which lift it to the top of the station and empty it into a loading chute.

The station shown in the illustration will handle one ton of



Steel Coaling Station for Small Terminals.

coal per minute. The machinery may be driven by a motor or gasoline engine, which is placed in a house between the two legs of the steel structure. A platform surrounds the top of the structure which is reached by a stairway. With this station it is not necessary to store any great quantities of coal. It requires a comparatively small space, and can be built for less than \$4,000 complete; it requires a hopper car as a storage bin which may be considered as an added cost of \$900. The station is compact, fireproof and can be attended to by one man who will be able to handle the machinery, as well as unload the coal from the car. The controlling levers are arranged so that the machinery may be stopped and started from several places about the station.

AUSTRALIAN TIE QUESTION.—The gradual deforestation of Australia is of economic importance to its railways. At the recent conference of the railway commissioners of the different states the subject was discussed, particularly as regards a future supply of ties. It was agreed that experiments with steel ties now being conducted in Queensland and South Australia should be continued. The Victorian Railways will also be laying down a number at various points of the Bendigo line. There is some likelihood of a more extensive use of a purely metallic or a concrete sleeper in place of wood.

SIBERIAN RAILWAY CONSTRUCTION.—The Russian minister of transportation reports that the requirements for the coming year will cost \$75,000,000, mostly for the continuation of the work on the railway down the Amur river, and the second track of the Siberian Railway, and for their rolling stock, shops, etc., leaving comparatively little for increasing the capacity of the lines in European Russia, which contains more than nine-tenths of the population of the empire.

General News Section.

The St. Louis Southwestern has installed a telephone train despatching circuit between Illmo, Mo., and Jonesboro, Ark., 131 miles.

Suits to recover penalties of \$1,800 for violations of the safety appliance laws have been filed at Fort Smith, Ark., against the Memphis, Dallas & Gulf.

The government has begun a suit against the Boston & Maine to enforce penalties for 29 violations of the hours of labor law, mostly in connection with the running of trains from Deerfield, Mass., to points in Vermont.

The Canadian Pacific announces that by the end of this year it will have a metallic circuit of copper wire for telephone train despatching throughout its main line from the Atlantic to the Pacific ocean, about 4,000 miles.

On trains running south from Albuquerque, N. M., the Atchison, Topeka & Santa Fe now employs "train auditors" to collect tickets and fares; 10 men to engage in this work having been sent to Albuquerque last week.

The Southern Pacific has appealed to the state department at Washington for the influence of this government with that of Mexico for the protection of the lives of its employees and the property of its railway lines in Mexico. The rebels have already destroyed about 40 bridges in eastern Sonora.

At Calera, in the northern part of the state of Zacatecas, Mexico, on the morning of September 5, a freight train ran into the rear of a preceding passenger train, and in the wreck that ensued, 12 persons were killed and 4 injured, the killed including Mr. Gritzberg, superintendent of a division of the National Railways, and his wife and four children.

The floods in the Ohio Valley, at the beginning of last week, washed away five concrete bridges on the Wheeling division of the Baltimore & Ohio, and did serious damage to the roadbed of the Wabash-Pittsburgh Terminal; the total damage to the latter road being estimated at \$150,000. Many coal mines have been flooded so that it will take weeks to pump out the water.

The Chicago, Burlington & Quincy has appointed three train rule examiners to drill trainmen and enginemen on the operating rules, what to do in emergencies, etc. S. H. Shults, heretofore division superintendent of the Galesburg division, and C. T. Salisbury have been appointed to the new positions, with office at Galesburg, and authority on the lines east, and C. P. Philbrick, with office at Wymore, Neb., for the lines west.

At Chicago, on Monday of this week, Jules Vedrines, of France, flying in a Deperdussin monoplane of 140 h. p., traversed a distance of 124.8 miles in 1 hour, 10 minutes, 56.85 seconds, winning a race by 2 minutes, 13 seconds over his best competitor. The average rate of speed for the whole distance was 105½ miles an hour, while for 2 minutes, 18 seconds he traveled at the rate of 108 miles an hour.

The London & Port Stanley Railway, extending from London, Ont., south 23 miles, via St. Thomas, to Port Stanley, is owned by the city of London, and the city council has voted to ask for bids for a lease of the road beginning January, 1914, on which date the lease under which it is now operated by the Pere Marquette will expire. The city council will also inquire into the feasibility of adopting electric power and operating the road directly.

The General Electric Company is to pension its old employees, on a basis similar to that in force on a number of the principal railways of the country, namely 1 per cent. of average pay for ten years, multiplied by the number of years in service. No pension will be over \$125 a month. The age of compulsory retirement is 70 years for men and 60 for women; the conditional limit is 65 years for men and 55 for women. The company employs about 40,000 men, its principal shops being at Schenectady, N. Y.; Lynn, Mass.; Pittsfield, Mass.; New York City; Harrison, N. J.; and Fort Wayne, Ind.

Telegraphers on the line of the Canadian Pacific have been taking a "strike vote," and it is reported at Winnipeg that the vote is almost unanimous against accepting the decision recently

rendered by a board of conciliation which acted under the law providing for such cases. Representatives of the Order of Railway Telegraphers continue their declarations in the newspapers that they are expecting to strike on the Pennsylvania, but nothing definite is made public. Claims are made that the constituency of this brotherhood on the Pennsylvania numbers 3,000, which seems greatly exaggerated, as considerable numbers of the operators belong to another organization.

About 300 employees and officers of the New York, Chicago & St. Louis attended the sixth annual meeting and dinner of the Veteran Association of that road in Chicago on Saturday, September 7. The program consisted of an outing at the Naval station in the forenoon, the annual meeting in the afternoon, and the dinner in the evening at the Hotel Sherman. The association is composed of men who have been in the service of the Nickel Plate 25 consecutive years or more. It numbers about 400 men, ranking from the general manager down to the track and shop employees. President W. H. Canniff and several officers of the road, not members, were also in attendance.

The Atlantic cables working in connection with the Western Union Telegraph Company have announced reductions in rates for messages. Regular cablegrams costing 25 cents a word, messages in plain language, with no code except in the address, will be sent, at the company's convenience, at nine cents a word, and night letters of 12 words will be sent for 75 cents. These must be filed before midnight and will be delivered at the convenience of the company within 24 hours. Week-end letters by cable will be sent at the rate of \$1.15 for 24 words. The rate for press cablegrams of seven cents a word will be modified during the hours most favorable for the newspapers, by a reduction of two cents a word.

At Fulton, Ky., September 3, Edward Korn, an aviator, flying about 60 ft. above the ground, was sucked down by a passing switching engine, and had a narrow escape from a fatal fall. Carrying one passenger, he rose from an exhibition ground near the Illinois Central track, and, being somewhat interfered with by buildings near the track, he passed over the railway just as the switching engine passed beneath; and the downward draft of air caused by the movement of the engine made such a change in the atmosphere that Korn lost control of his machine. A passenger train moving in the opposite direction came along just as he was trying to land, and he was obliged to alight in the ditch, with one of the wings of his machine lying across the railway track, where it was cut off by the passenger train.

Among the men on the regular pay roll of the Westinghouse Electric & Manufacturing Company, at East Pittsburgh, Pa., this summer were 29 professors and teachers from 25 colleges. These men, members of the faculties of the most prominent engineering schools in the country, have devoted their vacation from their regular work to this service in the shops, to more fully familiarize themselves with the things that they talk about in the class room, and to learn at first hand just what is before the young men whom they are educating. The colleges represented are in 19 different states, very few of the institutions being represented by more than one man. These workers are assigned check numbers the same as other employees. After the day's work is done they make tours of inspection, on which various pieces of apparatus are explained to them by the engineers who have designed the machines. Evening meetings also are held for discussion. The dean of this novel body of students, elected to the place by the Westinghouse company, is Professor George B. Thomas, of Colorado College, Colorado Springs.

Section Foremen's Accounting on the Central of Georgia.

The instruction paper on Section Foremen's Accounting, issued by the educational bureau of the Central of Georgia, has been made the official code of instructions of the accounting and maintenance of way departments, and all section foremen are now required to follow these instructions in rendering reports of labor and material. The foreman is required to keep this instruction paper, as he will be referred to it whenever he fails

to make his reports out correctly. In order that the officers may know that the foreman understands these instructions, examination questions have been placed on the back of the instruction paper. The foreman fills out his answers, returning them to the bureau, where they are corrected, graded and then returned to the foreman.

Co-operative Education on the Illinois Central.

The Illinois Central and the authorities of the public schools at McComb, Miss., recently adopted a novel plan for giving young men an opportunity to take simultaneously a high school course and an apprenticeship course. The Illinois Central has locomotive and car shops and a foundry at McComb. The regular apprenticeship course in these shops covers four years. The superintendent of schools some time since asked the management of the Illinois Central to provide in connection with the high school a small shop in which students of manual training could get practical experience.

The result of the subsequent negotiations is an arrangement under which high school students who wish to take an apprenticeship course will take manual training in their first year in high school, will be credited with this year by the railway as one year of their apprenticeship course, and during the remaining three years will spend alternate days in the high school and in the shops. At the end of the period they will have completed both their apprenticeship and their high school courses. Eighteen young men are now taking the joint apprenticeship and high school course in this way, having begun when school opened a short time ago. The instruction of the apprentices in the shops is in charge of an apprentice shop demonstrator, and the entire plan has the approval of the mayor, the city council and the school board of McComb and the master mechanic and superintendent of shops of the Illinois Central. As a result of the introduction of this plan the Illinois Central now has three classes of apprentices in the McComb shops: Special apprentices, who must be technical graduates and who take a two years' course, the regular indentured apprentices who take a four years' course, and those taking the new course.

It is believed that this is the first time in the history of railroading in the United States that such a combination of high school and apprenticeship courses has been adopted. Of course, its adoption was made possible by the strike of shop employees on the Illinois Central which resulted in the abolition of union rules in regard to apprentices. The management of the Illinois Central hopes to extend the new apprenticeship system to other places on its line where it has shops. Plans are already well along at several other towns and cities.

Master Car Builders' Association.

The committees of the Master Car Builders' Association for the 1913 convention are as follows:

STANDING COMMITTEES.

Arbitration:

J. J. Hennessey (C. M. & St. P.), chairman; T. W. Demarest (Penna. Lines); J. S. Lentz (L. I.); M. K. Barnum (I. C.); F. W. Brazier (N. Y. C. & H. R.).

Revision of Standards and Recommended Practice:

T. H. Goodnow (C. & N. W.), chairman; W. E. Dunham (C. & N. W.); W. H. V. Rosing (St. L. & S. F.); C. E. Fuller (U. P.); T. M. Ramsdell (C. & O.); O. C. Cromwell (B. & O.); O. J. Parks (Penna. Lines).

Train Brake and Signal Equipment:

R. B. Kendig (N. Y. C. Lines), chairman; B. P. Flory (N. Y. O. & W.); E. W. Pratt (C. & N. W.); R. K. Reading (Penna. R. R.); L. P. Streeter (I. C.).

Brake Shoe and Brake Beam Equipment:

Prof. Chas. H. Benjamin (Purdue University), chairman; C. D. Young (Penna. R. R.); R. B. Kendig (N. Y. C. Lines).

Coupler and Draft Equipment:

R. L. Kleine (Penna. R. R.), chairman; G. W. Wildin (N. Y. N. H. & H.); F. W. Brazier (N. Y. C. & H.); J. F. DeVoy (C. M. & St. P.); F. H. Stark (Pittsburg Coal Company); H. L. Trimyer (S. A. L.); B. Julien (U. P.).

Rules for Loading Materials:

A. Kearney (N. & W.), chairman; R. E. Smith (A. C. L.);

L. H. Turner (P. & L. E.); W. F. Kiesel (Penna. R. R.); J. M. Borrowdale (I. C.); C. N. Swanson (A. T. & S. F.); G. H. Gilman (N. P.).

Car Wheels:

William Garstang (C. C. C. & St. L.), chairman; W. C. A. Henry (Penna. Lines); A. E. Manchester (C. M. & St. P.); R. W. Burnett (C. P.); R. L. Ettenger (Southern); J. A. Pilcher (N. & W.); O. C. Cromwell (B. & O.).

Safety Appliances:

C. E. Fuller (U. P.), chairman; A. Stewart (Southern); A. LaMar (Penna. Lines); C. B. Young (C. B. & Q.); H. Bartlett (B. & M.); M. K. Barnum (I. C.); W. O. Thompson (N. Y. C. & H. R.).

SPECIAL COMMITTEES.

Car Trucks:

J. T. Wallis (Penna. R. R.), chairman; J. R. Gould (C. & O.); J. J. Tatum (B. & O.); E. W. Pratt (C. & N. W.); R. W. Burnett (C. P.); James Coleman (G. T.); G. A. Hancock (St. L. & S. F.).

Prices for Labor and Material:

F. H. Clark (B. & O.), chairman; G. E. Carson (N. Y. C. & H. R.); C. F. Thiele (P. C. C. & St. L.); Ira Everett (L. V.); J. F. Dunn (Oregon Short Line); S. T. Park (C. & E. I.); H. E. Passmore (T. & O. C.).

Train Lighting and Equipment:

T. R. Cook (Penna. Lines), chairman; C. A. Brandt (C. C. & St. L.); Ward Barnum (L. & N.); J. H. Davis (B. & O.); C. H. Quinn (N. & W.); D. J. Cartwright (L. V.); E. W. Jensen (I. C.).

Train Pipe and Connections for Steam Heat:

I. S. Downing (L. S. & M. S.), chairman; C. A. Schroyer (C. & N. W.); W. C. Arp (Vandalia); T. H. Russum (B. & O.); J. J. Ewing (C. & O.).

Nominations:

F. W. Brazier (N. Y. C. & H. R.), chairman; A. W. Gibbs (Penna. Lines); C. A. Seley (C. R. I. & P.); C. A. Schroyer (C. & N. W.); F. H. Clark (B. & O.).

Arrangements:

C. E. Fuller (W. P.).

Tank Cars:

A. W. Gibbs (Penna. Lines), chairman; Thos. Beaghan (Union Tank Line); J. W. Fogg (B. & O. C. T.); S. K. Dickerson (L. S. & M. S.); C. E. Chambers (C. R. R. of N. J.); E. J. Searles (B. & O.); Wm. Schlafge (Erie); C. A. Shoemaker (German-American Car Lines).

Specification for Tests of Steel Truck Sides and Bolsters for Cars of 80,000, 100,000, 150,000 Lbs. Capacity:

Prof. E. C. Schmidt (University of Illinois), chairman; J. S. Sheafe (I. C.); C. D. Young (Penna. R. R.).

Capacity Marking of Cars:

C. E. Fuller (U. P.), chairman; M. K. Barnum (I. C.); A. W. Gibbs (Penna. Lines); F. H. Clark (B. & O.); D. R. MacBain (L. S. & M. S.).

Lettering Cars:

D. F. Crawford (Penna. Lines), chairman; F. H. Clark (B. & O.); F. A. Torrey (C. B. & Q.); D. R. MacBain (L. S. & M. S.).

Damage to Freight Equipment by Unloading Machines:

P. F. Smith, Jr. (Penna. Lines), chairman; J. J. Tatum (B. & O.); E. A. Westcott (Erie); I. S. Downing (L. S. & M. S.); J. J. Birch (N. & W.); J. E. O'Hearne (W. & L. E.).

Air Brake Hose Specifications:

M. K. Barnum (I. C.), chairman; J. R. Onderdonk (B. & O.); J. J. Birch (N. & W.); C. D. Young (Penna. R. R.); A. J. Cota (C. B. & Q.); I. S. Downing (L. S. & M. S.); H. T. Bentley (C. & N. W.).

Conference with Association of American Railway Accounting Officers:

D. F. Crawford (Penna. Lines), chairman; C. E. Fuller (U. P.); M. K. Barnum (I. C.).

Revision of Present Specifications:

C. D. Young (Penna. R. R.), chairman; J. S. Sheafe (I. C.); J. W. Taylor (secretary).

Car Construction:

W. F. Kiesel, Jr. (Penna. R. R.), chairman; C. A. Soley (C. R. I. & P.); E. A. Gilbert (S. P.); A. R. Ayers (L. S. & M. S.); S. G. Thomson (P. & R.).

Master Car and Locomotive Painters' Association of the United States and Canada.

The forty-third annual convention of the Master Car and Locomotive Painters' Association of the United States and Canada was held in the Albany hotel, Denver, Colo., September 10-13.

J. T. McCracken, master painter of the Interborough Rapid Transit, New York, presided. Dr. Elmer E. Higley, pastor of the Grace M. E. Church invoked the divine blessing. Henry J. Arnold, mayor of Denver, gave the address of welcome. Chas. E. Copp, master painter of the Boston & Maine at Concord, N. H., responded to the mayor. J. F. Enright, superintendent of motive power and car department of the Denver & Rio Grande presented an address. The secretary-treasurer reported a total membership of 304 and a cash deficit of \$46. A complete report of the convention will appear in the next issue of the *Railway Age Gazette*. Following is a list of the exhibitors:

American Roll Gold Leaf Company, Providence, R. I.—Maker of roll gold for decorating purposes. Represented by T. J. Lawler.

N. Z. Graves Co., Philadelphia, Pa.—Maker of paints and varnishes. Represented by H. C. Carpenter, Philadelphia, Pa.

Charles R. Long, Jr., Co., Louisville, Ky.—Maker of all kinds of railway paints; special illustrations on Stabrite front-end and stack paint. Represented by Harry Vissering, Chicago; S. W. Russell, Louisville, Ky., and H. L. Bell, Louisville, Ky.

Louisville Varnish Company, Louisville, Ky.—Maker of oil and varnishes; exhibit of Lino Leate oil. Represented by W. J. Bartlett, E. H. Hancock and J. H. Hunter Ross, of Louisville, Ky.; E. C. Ross, of New York, and B. C. Scott, of Denver, Col.

National Lead Company, New York—Maker of lead colors. The linseed oils exhibit consisted of souvenirs and an illustrated booklet on the protection of structural metal. Represented by W. B. Sale, Denver, Col.

Pennsylvania Specialty Company, Philadelphia, Pa.—Maker of Won Kote paints. The exhibition consisted of samples of various paints. Represented by E. B. Wheeler, Philadelphia, Pa.

Wolfe Brush Company, Pittsburgh, Pa.—Maker of paint brushes of all kinds. The exhibit included a great variety of types of brushes used in railway work; special attention being given to new surfacer, varnish, enamel, color and stencil brushes. Represented by W. T. Hogan and W. S. Lang, of Pittsburgh, Pa., and C. H. Struble, of Chicago.

St. Louis Railway Club.

The first regular meeting of the St. Louis Railway Club for the fall season will be held Friday evening, September 13, at the Mercantile Club building, St. Louis. Samuel O. Dunn, editor of the *Railway Age Gazette*, will deliver an address on Government Regulation of Railway Operation.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Convention, May, 1913, St. Louis, Mo.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—W. C. Cooder, Carew building, Cincinnati, Ohio; 3d Friday of March and September.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York. Convention, October 7-11, Chicago.

AMERICAN ELECTRICAL RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; annual, November 20, 1912, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 1011 S. Michigan Ave., Chicago. Convention, March 18-20, 1913, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOC.—J. W. Taylor, Old Colony building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Convention 3d week in January, 1913, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreuccetti, C. & N. W. Ry., Chicago; annual, October 21-25, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago; annual, May 20, 1913, St. Louis, Mo.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Meeting Dec. 10-11, 1912, New Orleans, La.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa. Convention, November 19-21, Chicago.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Convention, May, 1913, Chicago.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NATIONAL RAILWAY APPLIANCES ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Tuesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York; annual, November 20, 1912, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo. Next meeting, Nov. 17, 1912, Cincinnati, Ohio.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Convention, Oct. 8-11, Quebec.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conaway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

RAILWAY TEL. AND TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Niquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, Oct. 17, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The Chicago, Milwaukee & St. Paul has opened a new passenger office and information bureau at 1200 Broadway, New York.

Traveling salesmen in the southwest are circulating petitions protesting against the use of the \$60 mileage scrip book which was issued by the Southwestern Passenger Mileage Bureau on July 1.

Charles A. Prouty, chairman of the Interstate Commerce Commission, has accepted an invitation to speak at the first fall luncheon of the Chicago Transportation Association at the Great Northern Hotel, September 19.

The passenger department of the Chicago & North Western has begun the publication of a monthly bulletin for the purpose of furnishing to its agents in concise form current information and items of news in connection with passenger traffic.

A proposal to abolish the reduced homeseekers' fares in Central Passenger Association territory was discussed at a meeting of the association last week, but was deferred until the next meeting. At the same meeting it was decided not to grant a reduced fare to office holders in the District of Columbia to return home for the fall election.

At Oklahoma City the express companies have given notice that hereafter freight brought to the railway station offices must be delivered to the agent 30 minutes before train time, and shipments delivered at the city offices must be there 60 minutes before train time—this to provide for the additional time demanded by the regulations requiring the pasting of two labels on every package.

The Missouri, Kansas & Texas has made an agreement with the Illinois Traction System, for a general interchange of passenger business, with interline tickets and through rates between all points on the electric line and the steam road. An interchange agreement for less than carload freight at Peoria has also been made between the traction company and the Minneapolis & St. Louis.

R. S. French, business manager of the National League of Commission Merchants, has called the attention of the members of the league to the importance of prompt and economical use of freight cars during the next few months, because of the prospect of a scarcity of cars. Special attention is called to the abuse of refrigerator cars in the past. In cold weather the use of refrigerators is absolutely necessary, while yet the supply is likely to be deficient, and every unnecessary delay of such a car will cause extensive losses.

The Farm Improvement Department of the Southern Railway, which is an outgrowth of the work undertaken by the railway company two years ago to assist in fighting the boll weevil in Alabama and Mississippi, has now been fully organized; and the manager is T. O. Plunkett, with office in Atlanta. Assistance without cost will be furnished to farmers throughout the southern states on all subjects in which the agents of the department can make themselves useful. Mr. Plunkett will have an assistant in each of three cities, Chattanooga, Tenn.; Charlotte, N. C., and Meridian, Miss.; and 26 field agents in other cities.

Government Review of Crop Conditions and Prices September 1, 1912.

The month of August, like July, was decidedly favorable for crop development in the United States, the composite condition of all crops September 1 being about 16.5 per cent. better than on September 1 last year, and 4.1 per cent. better than the average on September 1 of recent years.

The condition of various crops on September 1 compared with their average condition (not normal) on September 1 of recent years follow:

Peaches, 130.0; apples, 126.2; spring wheat, 118.7; oats, 171.1; pears, 110.8; hemp, 109.9; barley, 109.5; potatoes, 109.5; cabbage, 108.4; flaxseed, 107.5; cloverseed, 106.9; tomatoes, 106.5; onions, 106.4; millet, 106.2; buckwheat, 106.0; grapes, 105.4;

Kafir corn, 105.2; alfalfa, 105.1; watermelons, 104.7; cantaloupes, 103.9; oranges, 103.8; broom corn, 103.2; hops, 102.4; sorghum, 102.0; cotton oil, 101.6; corn, 101.2; sugar beets, 101.0; rice, 101.0; lima beans, 100.6; dry beans, 100.5; tobacco, 99.4; cranberries, 99.1; peanuts, 98.6; sweet potatoes, 98.4; lemons, 97.8; sugar cane, 93.2.

The indications are for a total production of all cereals (133,016,000 tons) of about 20.3 per cent. more than last year, 6.1 per cent. more than in 1910, and 16.2 per cent. more than in 1909. Potato prospects are for about 36 per cent. more than last year, 14 per cent. more than in 1910, and 2 per cent. more than in 1909. Hay estimated yield is about 31 per cent. more than last year, and 4 per cent. more than in 1910 and 1909.

The composite condition of all crops, duly weighted, by states, on the basis of 100 representing average conditions (for most crops the ten-year average), is as follows:

Maine, 106.8; New Hampshire, 111.8; Vermont, 108.5; Massachusetts, 103.5; Rhode Island, 96.3; Connecticut, 99.6; New York, 102.9; New Jersey, 100.5; Pennsylvania, 102.5; above division, 104.1.

Delaware, 108.1; Maryland, 102.8; Virginia, 96.7; West Virginia, 119.7; North Carolina, 95.3; South Carolina, 95.4; Georgia, 92.6; Florida, 99.5; above division, 96.8.

Ohio, 97.5; Indiana, 92.0; Illinois, 100.3; Michigan, 95.6; Wisconsin, 104.6; above division, 98.1.

Minnesota, 111.4; Iowa, 117.3; Missouri, 105.0; North Dakota, 125.6; South Dakota, 109.5; Nebraska, 100.7; Kansas, 115.1; above division, 112.3.

Kentucky, 104.0; Tennessee, 99.5; Alabama, 100.2; Mississippi, 95.4; Louisiana, 99.6; Texas, 110.9; Oklahoma, 104.8; Arkansas, 100.1; above division, 102.9.

Montana, 107.5; Wyoming, 112.5; Colorado, 113.3; New Mexico, 109.7; Arizona, 109.5; Utah, 105.7; Nevada, 101.0; Idaho, 107.3; Washington, 107.6; Oregon, 113.4; California, 102.1; above division, 107.6.

Prices paid to producers of the United States on September 1 of 1912 and 1911, respectively, averaged as follows: Corn, 77.6 cents per bu.; wheat, 85.8 cents, 84.8 cents; oats, 35.0 cents, 40.4 cents; barley, 53.5 cents, 77.0 cents; rye, 70.8 cents, 76.9 cents; buckwheat, 76.6 cents, 74.0 cents; flaxseed, 162.6 cents, 203.6 cents; potatoes, 65.0 cents, 113.7 cents; hay, \$12.14, \$14.61 per ton; cotton, 11.3 cents, 11.8 cents per lb.; butter, 24.2 cents, 23.1 cents; chickens, 11.3 cents, 11.1 cents; eggs, 19.1 cents, 17.4 cents, per dozen.

Prices on August 15 of 1912 and 1911, respectively, averaged: Hogs, \$7.11, \$6.54 per 100 lbs.; beef cattle, \$5.38, \$4.39; veal calves, \$6.62, \$5.93; sheep, \$4.26, \$3.98; lambs, \$5.60, \$5.25; milch cows, \$46.08, \$42.26 each; horses, \$142, \$141; milk, 22.4 cents, 21.2 cents per gal.; apples, 67.4 cents, 73.0 cents; peaches, \$1.08, \$1.38; beans, \$2.39, \$2.20; sweet potatoes, \$1.03, \$1.07; onions, \$1, \$1.16; clover seed, \$9.80, \$9.65; timothy seed, \$3.25, \$6.52; wool, unwashed, 18.8 cents, 16.0 cents per lb.; peanuts, 5.0 cents, 5.3 cents; cabbages, \$1.88, \$2.47 per 100 lbs.; broom corn, \$83, \$72 per ton; cotton seed, \$18.02, \$20.45; bran, \$27.43, \$25.92.

Traffic Club of New York.

At the next regular meeting of the Traffic Club of New York, to be held at the Waldorf Astoria, September 24, the moving pictures, taken at the annual outing last July, will be shown.

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 128, covering car balance and performance for May, 1912, says:

The miles per car per day, including surplus cars, averaged 23.7, both in May, 1911, and May, 1912, compared with 23.3 in April, 1912. Ton miles per car per day increased from 340 in April to 350 in May, as compared with 338 in May, 1911. The proportion of home cars on line increased from 53 per cent. in April to 57 per cent. in May, compared with 66 per cent. in May, 1911.

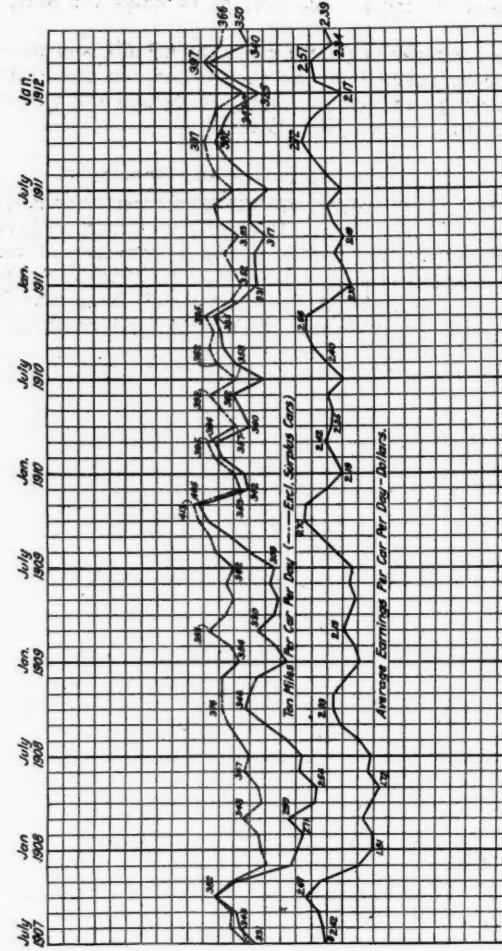
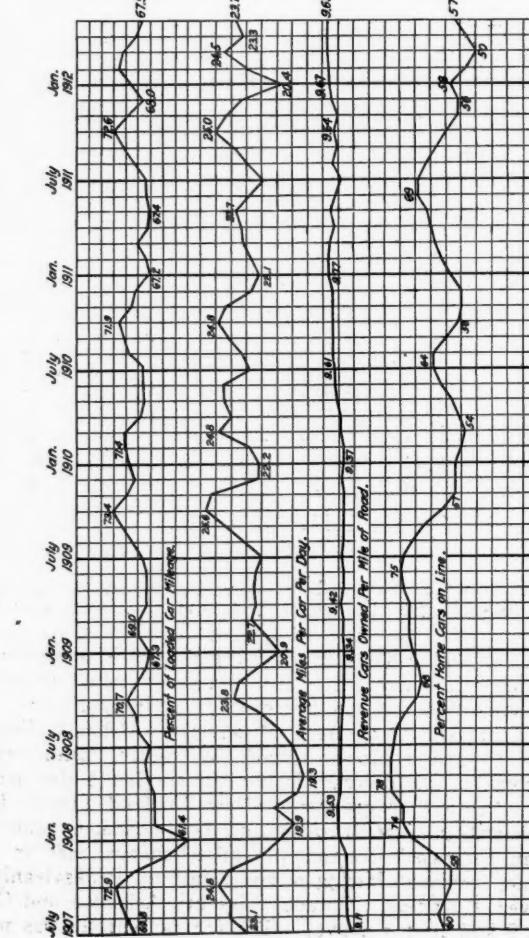
"There is a slight decrease (1.2 per cent.) in the percentage of loaded mileage, compared with April, 1912. Compared with May, 1911, there is an increase of 5 per cent."

"Compared with April the average earnings per car per day

PRESENT CIR. BALANCE AND PERFORMANCE IN MAY, 1912.

	N. Y., N. J., Ohio, Ind., Del., Md., Conn., Pa.	Va., W. Va., Mich., Miss., Ala., Ga., Fla., Carolina, Western Pa.	Ky., Tenn., Ill., Wis., Minn., Iowa, Mo., Ark., Colo., Okla., Dakota, Mont., Wyo., Neb., Dakota, Minn., Colo., Ariz.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines	Grand Total.
Revenue freight cars owned.....	85,129	213,039	190,804 173,661 89,238 106,160 70,976	398,798 17,533 239,367 5,850 12,011	143,333 141,337 21,510 21,510 21,127	114,697 114,697 69,259 71,810 51,452	2,222,404 1,136,802 809,945
Average number of system cars on line.....	43,805	293,590	119,599	27,588	143,333	114,697	2,222,404
Railway-owned cars: Average foreign on line.....	42,891	178,327	99,582	27,588	143,333	114,697	2,222,404
Total Railway-owned cars on line.....	94,730	471,917	219,181 6,142	183,029 *7,775 *13,447	160,214 40 35	128,795 *12,542 328	123,262 *20,071 19,884
Excess	1,567	*26,933					1,954,781 *58,022
Per cent. of cars on line to total owned.....							
Home	52	59	56	51	60	33	54
Foreign	50	35	47	40	41	35	45
All railways	4,214	31,067	11,854	96 4,350	92 8,071	102 1,542	78 8,848
Private cars on line.....							
Total, all cars on line.....	98,944	502,984	231,035	187,379	168,285	394,542	19,403
Per cent. of cars in shop.....	6.66	7.08	6.40	7.19	9.77	6.43	137,643
No. of freight engines owned.....	1,425	10,883	3,086	3,325	2,810	6,408	46,916
Average cars on line per freight engine owned.....	69	63	75	56	60	62	135,308
Total freight-car mileage.....	56,286,440	518,258,000	158,786,441	148,229,560	131,523,575	280,573,034	2,060,730
Average mileage per car per day.....	18.4	22.2	22.3	25.5	25.3	22.4	4.76
Per cent. loaded mileage.....	73.9	64.9	67.9	63.1	68.1	70.7	7.39
Ton-miles of freight, including company freight.....	620,558,326	7,853,041,648	2,629,511,287	2,198,217,932	1,722,198,320	2,893,161,552	1,567,781,764
Average ton-miles, including company freight:							
Per car-mile	11.0	16.1	16.9	14.8	13.2	13.6	11.5
Per loaded car-mile	14.9	24.9	24.8	23.5	19.4	19.4	14.2
Per car per day.....	202	358	376	378	334	305	21.5
Gross freight earnings	\$7,039,929	\$45,824,498	\$13,967,122	\$12,673,907	\$11,564,330	\$28,689,804	\$10,689,490
Average daily earnings: Per car owned	\$2.39	\$2.13	\$2.11	\$2.14	\$2.15	\$2.32	\$2.36
Per railroad car on line.....	2.35	2.26	2.06	2.23	2.23	2.44	2.34
All cars on line.....	2.26	2.12	1.95	2.18	2.22	2.35	2.51

INDIA 1-CONT.



Enriched Gas Performance 1003 to 1012

increased .05 cents. The average earnings for May, 1911, were \$2.33."

The accompanying table gives car balance and performance in the month covered by the report, and the two diagrams show car earnings and car mileage and certain car performance figures monthly from July, 1907.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 125-B, giving a summary of car surpluses and shortages by groups from May 10, 1911, to August 29, 1912, says: The total surplus on August 29, 1912, was 36,047 cars; on August 15, 1912, was 58,623 cars, and on August 30, 1911,

ally decreased, with the exception of groups 7 (Montana, Wyoming and Nebraska) 8 and 9 (as above), and 11 (Canadian Lines).

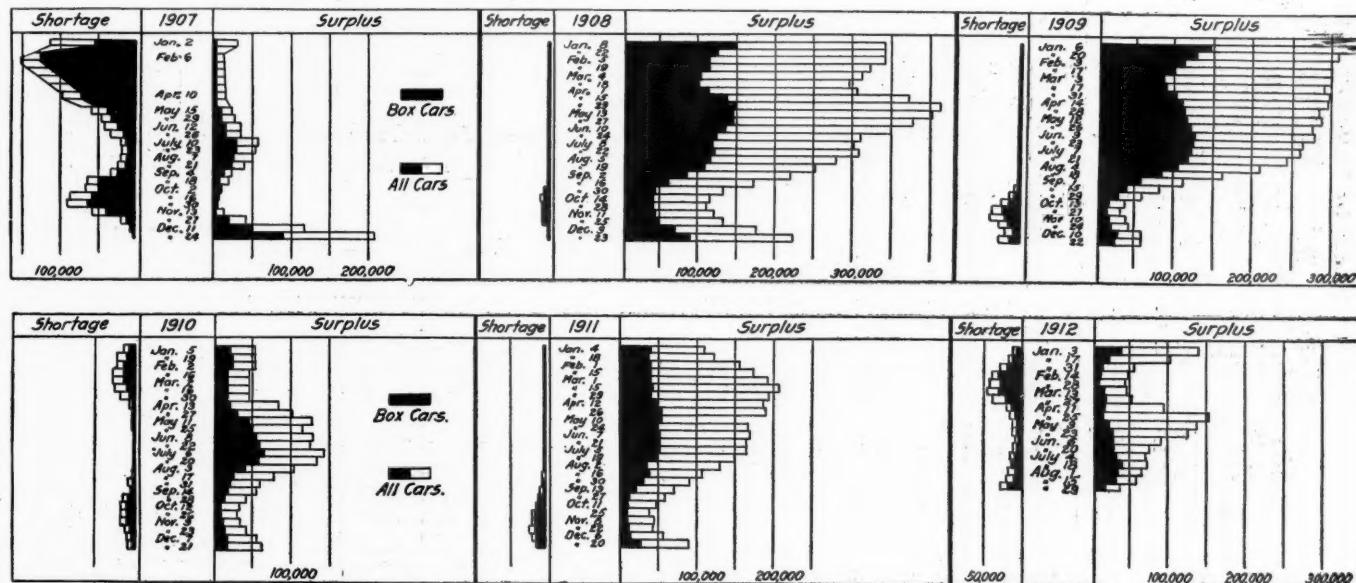
The total shortage on August 29, 1912, was 26,297 cars; on August 15, 1912, was 14,722 cars, and on August 30, 1911, was 4,325 cars.

Compared with the preceding period there is an increase in the total shortage of 11,575 cars, of which 8,494 are in box, 621 in flat, 2,305 in coal and 155 in miscellaneous cars. The increase in coal car shortage is principally in groups 1, 3, 5, 6 and 8 (as above). The increase in box car shortage is general throughout the country, with the exception of groups 1 and 9 (as above). The increase in flat car shortage is in groups 1, 4, 5, 8 and 11 (as above). The increase in miscellaneous car short-

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses				Shortages					
		Box.	Flat. and hopper.	Coal, gondola	Other kinds.	Total.	Box.	Flat. and hopper.	Coal, gondola	Other kinds.	Total.
Group *1.—August 29, 1912.....	7	734	97	0	128	959	612	337	817	0	1,766
" 2.— " 29, 1912.....	23	367	65	822	291	1,545	702	100	951	141	1,894
" 3.— " 29, 1912.....	27	278	140	135	1,747	2,300	2,463	299	1,436	421	4,619
" 4.— " 29, 1912.....	11	114	0	454	460	1,028	2,701	814	1,195	431	5,141
" 5.— " 29, 1912.....	21	182	0	238	1,019	1,439	1,409	770	1,062	5	3,246
" 6.— " 29, 1912.....	23	7,069	119	881	3,269	11,338	3,428	52	1,217	15	4,712
" 7.— " 29, 1912.....	2	0	88	0	114	202	426	0	79	0	505
" 8.— " 29, 1912.....	17	579	119	583	1,886	3,167	1,595	432	242	8	2,277
" 9.— " 29, 1912.....	13	1,395	180	383	436	2,394	271	0	0	0	271
" 10.— " 29, 1912.....	21	1,408	994	1,797	5,066	9,265	888	8	9	46	951
" 11.— " 29, 1912.....	7	2,054	51	0	305	2,410	412	367	0	136	915
Total, August 29, 1912.....	172	14,180	1,853	5,293	14,721	36,047	14,907	3,179	7,008	1,203	26,297
" August 30, 1911.....	165	28,108	2,834	29,249	28,675	88,866	2,743	518	921	143	4,325
" August 31, 1910.....	155	20,315	3,488	14,108	22,111	60,022	4,594	914	2,964	821	9,293
" September 1, 1909.....	175	54,284	6,416	25,842	24,034	110,576	1,713	418	1,585	183	3,899
" September 2, 1908.....	160	84,644	12,970	85,247	39,771	222,632	928	108	355	27	1,418

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1912.

was 88,866 cars. Compared with the preceding period there is a decrease in the total surplus of 22,576 cars, of which 13,379 is in box, 448 in flat, 4,365 in coal and 4,384 in miscellaneous cars. The decrease in coal car surplus is general throughout the country with the exception of groups 4 (Virginias and Carolinas), 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida) and 6 (Iowa, Illinois, Wisconsin, Minnesota and the Dakotas). The decrease in box car surplus is also general with the exception of groups 1 (New England Lines), 9 (Texas, Louisiana & New Mexico) and 11 (Canadian Lines). There is an increased demand for miscellaneous cars in groups 3 (Ohio, Indiana, Michigan and Western Pennsylvania), 6 (as above), 8 Kansas, Colorado, Missouri, Arkansas and Oklahoma) and 9 and 10 (as above). The flat car surplus has proportion-

ately decreased, with the exception of groups 7 (Montana, Wyoming and Nebraska) 8 and 9 (as above), and 11 (Canadian Lines).

Compared with the same date of 1911 there is a decrease in the total surplus of 52,819 cars, of which 13,928 is in box, 981 in flat, 23,956 in coal and 13,954 in miscellaneous cars. There is an increase in the total shortage of 21,972 cars, of which 12,164 is in box, 2,661 in flat, 6,087 in coal and 1,060 in miscellaneous cars.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and totals for the country for corresponding dates in previous years; and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1912.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OR JUNE, 1912.

Name of road.	Operating revenues			Maintenance of way and equipment			Operating expenses			Net operating revenue	Outside operations, net	Taxes.	Operating income (or deficit) comp. with last year.	
	Mileage operated at end of period.	Freight.	Passenger.	Total, inc. misc.	Traffic.	Transportation.	General.	Total, (or deficit).	Taxes.					
Central of Georgia	1,915	\$587,728	\$324,657	\$966,320	\$143,967	\$37,886	\$39,122	\$741,426	\$62,247	\$167,036	\$167,422	\$3,080	-\$3,251	
Western Maryland	543	494,580	90,346	612,813	113,927	61,787	12,917	428,533	184,594	3,828	21,000	167,422	-\$3,251	
Central of Georgia	1,915	\$8,887,839	\$3,777,488	\$13,932,153	\$1,843,881	\$2,351,625	\$415,828	\$4,845,230	\$466,698	\$9,923,262	\$4,008,891	\$68,590	\$451,977	\$46,551
Western Maryland	543	6,001,113	942,553	7,243,058	857,007	897,958	125,568	2,662,848	168,843	4,707,864	2,535,194	3,431	2,286,625	-\$244,657
Alabama & Vicksburg	143	\$95,775	\$42,297	\$147,293	\$19,730	\$3,557	\$50,943	\$40,136	\$42,426	\$5,975	\$36,618	\$19,681	-\$17,280	
Alabama Great Southern	309	237,527	106,782	342,259	47,760	79,553	126,776	8,915	276,569	13,935	83,112	16,687	16,687	
Arizona Eastern	367	153,465	34,637	197,513	17,291	12,367	49,471	7,723	102,722	12,096	95,469	20,724	20,724	
Atchison, Topeka & Santa Fe	8,201 ^a	4,917,448	2,115,421	7,611,590	1,515,997	1,212,590	165,209	5,254,007	2,357,112	329,388	2,074,504	38,879	38,879	
Atlanta, Birmingham & Atlantic	662	169,261	62,880	241,301	42,238	41,189	17,394	11,343	233,738	13,563	15,700	2,137	45,032	
Atlantic & St. Lawrence	117	62,574	33,734	106,498	2,467,757	18,316	4,170	3,301	101,158	5,340	7,314	1,974	-\$3,397	
Atlantic Coast Line	4,600 ^b	1,611,001	680,711	2,201,412	380,422	1,433,345	41,641	968,853	75,049	523,390	125,000	398,590	93,077	
Baltimore & Ohio—System	4,455 ^c	6,150,460	1,406,799	8,052,885	1,377,879	1,377,879	17,778	2,749,026	165,774	5,660,474	2,392,411	-102,193	66,863	
Baltimore & Ohio Chicago Terminal	77	2,227	149,008	217,777	17,778	17,508	693	3,946	102,922	46,086	955	10,156	27,725	
Bangor & Aroostook	157,510	54,794	234,503	49,703	32,159	4,135	76,366	12,626	174,989	59,514	.....	49,014	4,509	
Bessemer & Lake Erie	204	979,616	38,085	1,028,428	77,692	135,257	9,583	216,989	10,631	450,652	577,776	9,000	568,776	96,985
Boston & Maine	2,244 ^d	2,249,331	1,589,341	4,207,884	484,067	38,922	1,751,501	91,187	2,973,722	1,234,162	20,922	172,351	1,022,733	
Buffalo & Susquehanna R.R.	265	115,094	9,064	128,464	28,402	23,137	1,375	43,249	6,117	102,280	26,136	2,200	23,936	629
Buffalo, Rochester & Pittsburgh	91	35,488	111,766	89,219	148,053	158,389	12,410	272,356	17,613	608,821	284,398	95	1,500	4,467
Butte, Anaconda & Pacific	46	82,373	12,735	102,765	18,954	20,140	710	43,687	8,117	15,648	2,000	13,648	6,739	
Carolina, Clinchfield & Ohio Ry. Co. of S.C.	18 ^e	8,170	16,945	18,601	1,547	1,153	75	6,405	3,626	79,933	106,257	.....	98,227	23,488
Central of Georgia	1,915	680,176	364,231	1,128,625	10,094	1,153	75	979	2,384	4,964	5,130	5,000	4,630	1,684
Central New England	1,915	2,277	285,327	31,313	303,506	161,945	20,900	35,657	40,943	840,689	287,936	427	10,000	144,455
Charleston & Western Carolina	341	91,233	30,396	128,116	31,447	3,456	52,091	4,581	117,255	10,861	5,000	5,861	-\$19,851	
Charleston & Ohio Lines	2,299 ^f	2,142,347	542,169	2,801,974	408,693	577,680	55,170	83,024	1,937,140	864,834	1,603	761,076	-\$10,683	
Chicago & Alton	1,026	751,864	383,131	1,230,611	152,328	227,260	41,062	402,170	32,318	855,138	375,473	38,000	336,417	42,886
Chicago & Eastern Illinois	1,275	935,521	263,462	1,301,928	141,805	229,015	21,883	461,844	45,462	900,009	401,919	3,312	361,607	-\$1,505
Chicago & Erie	12	356,270	356,748	68,490	464,727	162,706	23,057	203,070	11,332	418,460	461,312	26	12,895	10,865
Chicago, Burlington & Quincy	9,075	4,545,502	2,037,986	7,295,923	1,095,979	1,216,084	147,419	2,350,017	190,289	4,999,788	2,296,135	16,907	27,847	225,178
Chesapeake & Ohio Lines	2,299 ^g	2,142,347	542,169	2,801,974	408,693	577,680	55,170	83,024	1,937,140	864,834	1,603	761,076	-\$10,683	
Chicago & Indiana & Southern	359 ^h	266,926	28,613	303,947	49,990	82,438	9,394	101,657	8,114	251,593	54,334	621	13,000	41,975
Chicago & Indianapolis & Louisville	617	346,867	145,888	544,283	86,428	75,332	18,129	212,374	16,162	408,225	162,058	23,651	11,407	-\$7,972
Chicago Junction	12	356,270	356,748	68,490	464,727	162,706	23,057	203,070	11,332	418,460	461,312	26	12,895	10,865
Chicago, Milwaukee & Puget Sound	2,081 ⁱ	1,362,571	258,635	1,632,929	204,765	159,370	57,829	466,739	20,183	909,246	723,683	18,693	75,000	667,376
Chicago, Milwaukee & St. Paul	2,551	3,731,938	1,451,588	5,760,618	828,051	113,977	158,108	43,434	443,791	33,729	71,036	3,817,229	1,942,889	1,776,267
Chicago, Peoria & St. Louis	1,496	103,060	32,261	144,088	21,041	36,160	7,287	2,031,458	53,337	64,063	5,337	4,300	21,812	-\$14,285
Chicago, Rock Island & Gulf	427	128,154	53,850	249,312	42,632	52,740	10,363	87,162	7,069	170,966	78,346	821	12,222	12,429
Chicago, Rock Island & Pacific	7,566 ^j	7,320,612	1,681,856	5,468,557	50,707	73,255	18,457	2,029,497	161,119	3,170,966	1,497,985	17,118	231,267	1,249,600
Chicago, St. Paul, Minneapolis & Omaha	1,744	745,561	440,650	1,228,709	195,157	166,355	32,718	497,706	32,006	923,942	354,767	978	66,297	289,448
Chicago, Terre Haute & Dayton	1,351	113,270	145,244	281,606	100,072	133,613	28,667	2,534	45,943	6,925	117,482	17,596	160,000	667,376
Cincinnati, Hamilton & Dayton	1,015	640,532	145,244	876,722	77,618	162,804	21,859	24,571	231,621	18,766	635,671	246,389	356	33,327
Cincinnati, New Orleans & Texas Pacific	337	556,897	34,334	590,261	105,427	22,122	20,205	27,248	43,628	30,755	152,019	251,799	21,800	240,041
Colorado Midland	338	91,016	32,318	147,812	620,991	99,091	140,37	10,910	188,654	21,597	460,989	159,702	1,353	291,717
Colorado, Lackawanna & Western	162 ^k	187,457	60,005	261,119	54,027	31,771	4,867	80,562	7,088	187,289	83,030	6,387	168,940	1,08,588
Denver & Rio Grande	2,355 ^l	4,354,049	731,146	3,334,456	513,355	488,941	68,945	954,812	64,262	2,090,315	1,244,141	6,653	760,000	481,163
Denver, Northwestern & Pacific	418 ^m	67,059	36,505	116,266	23,945	17,716	2,223	30,391	3,925	78,200	38,067	3,507	207,000	1,776,267
Detroit & Mackinac	79	105,041	105,427	110,385	19,004	14,901	2,658	37,709	2,615	76,887	33,498	1,465	8,813	4,042
Detroit, Toledo Shore Line	191	102,000	60,000	183,623	25,085	24,592	7,176	5,372	6,244	62,440	42,987	70	4,630	38,337
Detroit, Grand Haven & Milwaukee	191	57,900	56,898	110,251	11,124	9,797	2,774	8,478	20	12,565	16,540	70	2,953	-\$5,543
Detroit, Toledo & Ironton	441	99,970	14,966	125,371	20,995	16,270	2,687	5,441	101,036	24,335	11,714	11,714	11,714	11,041
Duluth & Iron Range	274 ⁿ	1,038,039	20,671	1,069,073	77,584	62,658	1,378	184,563	14,005	340,284	72,789	5,4387	63,5183	124,231
Duluth, South Shore & Northern	205,439	99,489	34,331	1,044,674	104,862	83,046	1,914	161,386	10,257	361,465	68,320	1,507	18,000	66,992
El Paso & Southwestern Co.	902	556,827	82,117	666,989	56,148	12,695	184,417	25,070	368,663	298,326	1,811	22,238	274,277	108,945
Elgin, Joliet & Eastern	1,017,566	1,017,566	1,123,001	114,251	11,124	1,124	1,650	16,502	16,502	2,622,438	1,691,992	8,622	1,38,546	5,046
Florida East Coast	630 ^o	131,934	94,773	260,156	74,320	51,307	4,691	116,553	11,010	2,275	1,275	1,275	1,275	1,275
Fort Worth, Harrisburg & San Antonio														

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JULY, 1912—(CONTINUED.)

Name of road.	Operating revenues			Maintenance			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Operating income (or loss).	Increase (or decrease) with last year.			
	Mileage operated at end of period.	Freight.	Passenger.	Total, inc. misc.	Way and structures.	Traffic equipment.	Transportation.	General.	Total.							
Great Northern	\$4,621,940	\$1,401,698	\$6,448,921	\$1,284,744	\$756,335	\$100,018	\$1,583,425	\$97,609	\$3,822,131	\$2,646,790	\$27,298	\$295,325	\$2,378,763			
Gulf & Ship Island	3,127,714	3,925	163,644	21,664	26,647	46,919	10,341	7,862	10,700	56,140	5,052	50,852	\$123,892			
Gulf, Colorado & Santa Fe	657,693	272,43	981,907	146,800	147,404	25,256	358,853	31,640	709,833	651,698	40,435	231,639	166,824			
Houston, East & West Texas	1,191	71,258	32,189	109,298	13,029	2,361	38,326	7,384	72,450	52,953	4,036	32,812	5,745			
Houston & Texas Central	789	338,598	158,508	534,840	61,384	26,096	18,908	211,847	16,788	385,023	149,817	19,382	128,738	39,603		
Illinois Central	4,763	3,190,323	1,145,932	5,064,511	787,774	1,197,202	122,234	1,964,036	128,039	4,199,275	865,236	-12,721	237,750	614,765		
Indiana Harbor Belt	1,052	540,241	211,094	801,268	241,228	26,530	89,397	6,030	161,845	7,924,341	4,508	5,560	78,191	-270,634		
International & Great Northern	1,160	256,512	473,817	3,533,707	140,021	116,016	23,485	342,948	29,228	149,570	651,698	3,852	30,000	115,718	30,888	
Kanawha & Michigan	1,177	2,941,525	93,479	3,127,550	426,549	54,240	77,540	1,023,061	63,561	171,121	155,460	-49	116,203	23,788	... ¹	
Kansas City Southern	827	610,406	148,905	833,397	128,722	128,764	24,698	290,707	30,518	550,852	283,945	... ²	35,842	247,103	49,299	
Lake Erie & Western	886	350,805	81,697	459,755	76,623	87,321	13,577	177,719	11,225	366,465	93,290	29,905	20,495	72,795	-34,997	
Lake Shore & Michigan Southern	2,827	1,140,701	1,140,660	4,444,169	663,994	767,756	91,191	1,368,349	77,650	2,968,940	1,477,723	145,000	1,360,134	54,986	...	
Lehigh & Hudson River	97	1,38,258	3,981	144,069	22,479	22,493	1,258	45,824	4,292	96,346	1,400,296	4,000	4,000	43,723	16,515	
Lehigh Valley	1,453	2,914,525	1,317,864	3,127,550	426,549	54,240	77,540	1,023,061	63,561	171,121	155,460	92,644	56,450	1,253,870	268,114	
Long Island	3,399	278,243	99,479	328,550	110,935	128,722	24,698	290,707	30,518	550,852	283,945	... ³	35,842	247,103	49,299	
Louisiana Ry. & Navigation	255	116,395	21,183	142,597	22,336	19,888	3,839	36,865	4,980	86,420	56,177	... ⁴	4,038	52,139	34,383	
Louisiana Western	208	111,033	49,866	168,735	15,856	23,468	6,795	49,459	5,323	107,624	54,577	5,500	49,077	11,113	...	
Louisville & Nashville	4,700	3,128,366	1,097,055	4,550,173	87,184	12,956	100,366	1,512,485	93,393	3,399,920	1,101,255	4,857	15,242	94,156	-127,108	
Louisville, Henderson & St. Louis	2,167	29,516	12,738	32,800	12,738	12,738	2,316	35,506	1,468	21,458	131,478	3,000	3,000	42,237	-22,147	
Maine Central	1,204	533,001	367,463	961,129	203,491	121,555	15,786	347,072	22,588	710,402	250,727	2,612	210,442	9,317	...	
Michigan Central	1,817,921	1,611,117	829,440	2,699,236	303,491	31,420	31,420	65,009	1,898,263	799,973	3,649	116,000	687,622	-48,701		
Midland Valley	59,038	3,920	104,256	104,256	31,420	17,895	2,548	5,12,045	92,211	12,045	345	5,468	6,922	-8,648		
Minneapolis & St. Louis	1,386	52,241,318	16,777	738,978	86,538	101,809	17,192	28,773	21,633	514,945	883,475	28,206	195,671	80,792	64,729	
Missouri, Kansas & Texas	1,39,938	1,431,454	71,059,020	2,283,432	429,949	353,041	63,793	839,062	72,007	1,757,852	525,580	1,351	101,200	425,731	...	
Missouri Pacific	1,712,674	461,950	2,343,608	322,142	316,914	316,914	178,446	903,104	68,761	1,782,530	561,078	-3,026	93,390	464,662	201,697	
Mobile & Ohio	1,763,106	124,339	92,500	166,914	120,797	23,806	12,732	34,475	28,905	704,021	1,265	29,859	20,000	5,308	400,527	
Morgan's La. & Tex. R. & S. Co.	65	116,897	2,385	120,797	23,806	12,732	2,385	34,475	28,905	704,021	1,265	29,859	20,000	5,308	16,606	
Nashville, Chattanooga & St. Louis	404	227,445	76,325	324,889	12,732	12,732	2,316	34,475	28,905	704,021	1,265	29,859	20,000	5,308	29,591	
New York, Ontario & Western	1,33,387	707,739	268,525	1,044,195	152,543	18,131	15,282	40,751	47,027	23,812	23,812	-347	25,416	206,419	6,642	
New Orleans & North Eastern	165	134,658	14,052	151,961	29,660	77,703	10,441	13,793	12,732	65,976	85,985	... ⁵	6,223	79,762	17,538	
New Orleans, Texas & Mexico	276	227,646	57,729	303,533	20,660	12,732	10,390	13,810	11,902	55,688	68,845	... ⁶	12,400	43,190	...	
New York Central & Hudson River	3,59,538	5,077,089	1,315,306	9,173,306	1,294,549	1,617,760	215,005	318,122	26,762	2,667,784	2,605,522	1,265	1,265	211,009	-300,751	
New York, Chicago & St. Louis	561	665,684	160,600	801,341	135,326	60,655	66,440	51,180	16,637	712,884	148,557	-1,182	36,000	111,275	-105,753	
New York, New Haven & Hartford	2,090	2,779,488	2,474,849	5,753,655	608,655	124,609	66,440	24,074	20,626,704	163,935	3,490,874	2,262,891	115,269	318,356	311,379	...
New York, Ontario & Western	566	632,330	46,325	977,552	100,441	118,093	9,664	285,680	17,701	541,579	2,462,202	107	18,167	418,144	...	
New York, Philadelphia & Norfolk	112	68,786	18,786	103,696	18,786	25,613	4,090	140,707	12,766	236,670	118,241	7,900	110,341	35,049	35,049	
New York, Susquehanna & Western	156	1,114	1,24,832	53,790	33,383	26,299	1,780	97,146	4,224	163,832	67,078	-6,398	17,649	43,031	-43,233	
Norfolk & Western	2,018	3,039,270	427,121	3,579,833	507,971	659,981	50,129	989,702	68,426	2,266,199	1,313,651	-3,384	120,000	1,191,200	212,356	
Norfolk Southern	608	2,768,756	1,59,692	57,500	37,040	6,269	4,99,417	88,286	193,792	102,041	-336	8,333	93,372	9,103	55,038	
Northern Pacific	603	3,768,765	255,346	388,089	48,910	115,085	11,713,723	88,286	193,792	102,041	654	654	38,700	12,579	157,154	
Oregon Short Line	1,762	1,268,329	508,597	1,87,397	1,521,096	178,432	144,273	45,596	511,032	42,905	922,238	598,858	4,938	18,405	901,675	64,498
Oregon, Washington R. R. & Nav. Co.	1,920	901,859	44,836	182,047	30,045	42,945	28,386	62,722	6,430	145,028	105,909	10,039	5,625	51,394	5,643	
Pecos & Northern Texas	1,75,49	4,586,382	852,569	5,984,821	801,700	986,723	81,919	1,843,489	93,080	3,806,912	2,187,909	-4,479	207,391	9,965,839	577,176	
Pennsylvania Railroad	4,021	10,522,526	3,160,157	14,666,734	1,886,165	2,751,464	205,179	4,935,022	333,004	10,111,444	4,555,290	-96,161	587,349	3,871,690	892,586	
Peoria & Eastern	57	1,279	185,931	442,833	263,237	39,645	4,479	101,210	57,243	45,535	47,227	1,922,77	71,010	9,800	13,515	
Pere Marquette & Reading	2,330	837,009	442,987	1,405,520	383,035	393,035	45,975	1,217,154	63,668	1,449,532	1,449,532	3,071	8,133	56,942	321,840	
Philadelphia & Baltimore	1,015	3,083,235	61,676	3,833,140	329,902	294,111	27,356	707,820	44,175	1,292,508	1,292,508	3,071	1,304	1,393,648	321,840	
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	2,540,886	689,632	3,608,091	509,039	682,783	69,217	1,243,462	68,820	5,287	5,287	1,034,690	763	1,377,744	896,193	
Pittsburgh, Shawmut & Northern	21	100,795	109,600	15,054	24,511	2,352	2,352	1,37,126	4,159	95,638	30,956	1,304	1,387	29,369	5,285	
Port Reading	473	479	66,817	237,817	27,616	27,616	2,962	75,077	5,302	47,732	13,261	8,000	5,136	59,034	22,563	
Richmond, Pittsburgh & Potomac	468	172,014	111,971	328,315	33,990	59,942	9,253	121,864	6,397	231,446	96,869	... ⁷	12,683	84,186	20,150	
Rutland	319	95,753	36,518	144,262	24,679	19,919	4,745	1,54,157	5,287	108,782	10,34,690	-763	1,377,744	896,193	256,	

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JULY, 1912—(CONTINUED.)

Name of road.	Mileage operated at end of period.	Operating revenues			Maintenance of equipment.			Way and structures.			Transportation.			General.			Total.	Net revenue operating (or deficit).	Outside operations, net.	Operating income (or loss).	Taxes.	Increase (or decrease) comp. with last year.				
		Freight.	Passenger.	Total.	Inc. misc.	Traffic.	Equipment.	Maintenance.	Inc. misc.	Total.	Inc. misc.	Traffic.	Equipment.	Maintenance.	Inc. misc.	Total.										
San Antonio & Aransas Pass	727	\$26,530	\$125,136	\$381,402	\$73,611	\$50,389	\$5,987	\$158,843	\$10,252	\$299,082	\$82,320	\$12,000	\$12,000	\$12,000	\$12,000	\$82,320	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000				
San Pedro, Los Angeles & Salt Lake	1,137	503,591	275,829	839,775	89,150	141,921	30,063	263,166	20,320	544,670	31,750	295,105	295,105	295,105	295,105	295,105	31,750	295,105	295,105	295,105	295,105	295,105	295,105			
Seaboard	3,074	1,119,919	2,757	1,738,577	275,625	65,189	275,625	65,189	275,625	51,177	445,177	2,478	81,090	35,619	35,619	35,619	35,619	35,619	35,619	35,619	35,619	35,619	35,619	35,619		
Southern	7,034	7,074	1,577,526	5,454,833	724,279	955,922	166,474	1,863,135	134,446	3,662,286	1,592,537	4,650	202,523	1,383,374	1,383,374	1,383,374	1,383,374	1,383,374	1,383,374	1,383,374	1,383,374	1,383,374	1,383,374	1,383,374		
Southern in Mississippi	281	37,039	24,580	68,942	29,470	8,226	3,078	33,691	3,785	70,153	9,308	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Southern Kansas of Texas	125	78,792	18,863	101,884	8,292	23,542	1,934	32,539	3,846	70,153	31,731	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Southern Pacific Co.	6,299	4,667,595	2,986,136	8,184,888	735,482	986,259	176,561	2,128,939	214,489	4,241,730	3,943,158	2,572	47,741	357,880	3,633,019	3,633,019	3,633,019	3,633,019	3,633,019	3,633,019	3,633,019	3,633,019	3,633,019	3,633,019	3,633,019	
Spokane, Portland & Seattle	551	80	230,824	192,463	454,846	49,740	80,200	10,745	99,571	206,125	248,171	3,180	53,400	14,417	65,909	65,909	65,909	65,909	65,909	65,909	65,909	65,909	65,909	65,909	65,909	
Syracuse, Binghamton & New York	81	62,737	35,059	110,609	18,983	12,943	3,037	37,992	1,866	70,226	35,788	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Tennessee Central	294	80,905	37,309	125,703	29,370	15,828	6,022	44,094	6,690	102,004	23,699	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Terminal R. R. Assn. of St. Louis	340	239,914	87,298	323,928	40,521	11,868	658	78,627	6,718	138,392	85,536	14,182	29,900	69,618	29,181	29,181	29,181	29,181	29,181	29,181	29,181	29,181	29,181	29,181	29,181	
Texas & New Orleans	458	348,936	348,936	1,276,822	259,798	254,475	32,336	135,178	10,999	286,982	59,612	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Toledo & Ohio Central	1,885	400,688	55,614	483,858	81,483	89,200	7,685	159,566	9,023	46,565	1,302,920	26,098	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Toledo, Peoria & Western	443	60,873	42,639	109,645	18,492	21,778	2,201	37,768	3,537	12,043	136,901	768	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Trinity & Brazos Valley	248	463	97,220	46,915	151,414	456,147	10,162	75,734	9,747	167,798	16,384	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Union Pacific	3,575	2,847,837	1,020,545	4,240,931	441,863	456,147	81,027	1,032,489	10,319	2,114,845	2,126,086	520	177,882	1,948,719	206,846	206,846	206,846	206,846	206,846	206,846	206,846	206,846	206,846	206,846	206,846	206,846
Union R. R. of Baltimore	9	115,279	20,383	137,271	10,652	90,137	761	5,435	2,613	117,810	117,810	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Union R. R. of Pennsylvania	31	556,116	212,123	881,863	149,224	168,839	27,348	324,819	115	144,364	2,727	211,787	214,247	1,825	4,750	207,622	30,421	30,421	30,421	30,421	30,421	30,421	30,421	30,421		
Vandalia	827	171	42,123	131,964	31,163	20,634	2,983	42,031	10,473	12,227	19,060	689,290	192,073	
Vicksburg, Shreveport & Pacific	420	124,952	16,805	145,722	22,522	36,520	1,637	38,768	3,111	102,558	19,744	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Virginia & Southwestern	475	336,408	26,764	376,550	56,499	69,691	5,462	9,266	8,630	235,708	43,169	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
Washash	2,516	1,692,933	656,503	2,550,011	363,504	531,406	94,283	951,694	62,094	2,002,981	547,030	3,798	71,655	471,577	64,520	64,520	64,520	64,520	64,520	64,520	64,520	64,520	64,520	64,520	64,520	64,520
Washington Southern	2,516	1,692,933	32,862	101,918	12,245	11,933	1,251	36,449	2,836	67,714	34,104	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......	.......
West Jersey & Seashore	335	189,532	615,899	844,014	95,006	93,393	17,127	249,174	11,907	466,607	377,407	530	17,517	147,517	341,984	33,481	33,481	33,481	33,481	33,481	33,481	33,481	33,481			
Western Pacific	93	385,623	129,598	530,266	44,644	32,017	189,499	220,979	132,703	7,835	324,744	116,722	59,914	13,636	462,091	252,279	29,525	29,525	29,525	29,525	29,525	29,525	29,525	29,525		
Wheeling & Lake Erie	459	610,516	64,852	714,370	86,938	116,722	15,972	209,514	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722			
Yazoo & Mississippi Valley	1,374	449,333	195,561	725,405	725,405	209,514	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722	116,722		

Average mileage operated during previous period—⁵⁰ 1,113; ⁵¹ 3,046; ⁵² 7,076; ⁵³ 6,214; ⁵⁴ 556; ⁵⁵ 35; ⁵⁶ 3,486; ⁵⁷ 457. —Indicates Deficits, Losses and Decreases.

Increased Team Track Storage Charges in Chicago.

Chicago consignees have been notified that for the purpose of expediting the release of freight cars there will be an increase in the charge for team track storage in the congested district. The free time will be the first 48 hours following the first 7 a. m. after the placing of cars. For the next succeeding two days the charge will be \$1 per car per day, and for each succeeding day the charge will be \$2 per car per day. W. A. Garrett, chairman of the General Managers' Association of Chicago, explained the reasons for the change in a circular in part as follows: "While the demurrage charge of \$1 per car per day after the expiration of 48 hours' free time has been considered reasonable for railway equipment held for loading and unloading through the United States, this charge in a congested district like Chicago is altogether too low, both because it does not begin to cover the interest on, and the cost of maintenance of, the property used, which is of extreme value, and, what is of more importance, it is not sufficiently effective in expediting the movement of cars in this congested and very important district. The practice of charging for track storage is not new, as a track storage charge is already in effect in New York. The railways do not want to derive any revenue from the track storage tariff; they do not want to derive any revenue from their demurrage tariff. A car is worth a great deal more to them, especially in busy seasons, than the demurrage that it earns when delayed, and the track room it occupies is worth a great deal more than the track storage charge that any railway man would have the courage to propose."

INTERSTATE COMMERCE COMMISSION.

The commission has suspended until January 11 tariffs filed by the Tennessee Central showing increased rates for the transportation of phosphate rock in bags or barrels to eastern cities.

The Interstate Commerce Commission has suspended until January 8 tariffs filed by the St. Louis & San Francisco providing for the concentration of cotton at Blytheville, Tenn., instead of allowing cotton to be stopped off for that purpose at Memphis, as is now the practice.

A firm of wine dealers has filed a complaint with the Interstate Commerce Commission charging discrimination in favor of California champagne in a rate of \$2 per 100 lbs. on champagne from the Pacific coast to New York, while the rate on champagne from New York to the Pacific coast is \$2.25.

The hearing which is to be held by the commission to further consider the rates charged by the express companies, which the commission has recommended shall be materially reduced, has been indefinitely postponed and may not be held for several weeks. This is because the tentative rates which were published by the commission have been found to be incorrect in many cases. The preparation of a satisfactory tariff is likely to require much time and labor.

Pipe Lines Appeal.

Seven of the 13 oil pipe line companies of the country have filed petitions in the Commerce Court for an injunction against the enforcement of the Interstate Commerce Commission's order that such lines shall publish tariffs, the same as carriers by rail. The petitioners say that the capacity of their pipe lines is only sufficient for the private business of the owners. Moreover they cannot be common carriers, as the pipe line has no facilities for the transportation of oils of different grade and value. The companies which have filed petitions are the following:

Prairie Oil & Gas Company, of Kansas; lines in Kansas, Oklahoma, Missouri, Iowa, Illinois, Indiana, Arkansas and Louisiana.

Uncle Sam Oil Company, refinery at Cherryvale, Kan.; pipe lines in Kansas, Oklahoma and Missouri.

Tide-Water Pipe Company; lines run from Pennsylvania to Bayonne, N. J., with branches from the Alleghany, N. Y., field; also a 6 in. pipe through Illinois, Indiana, Ohio and Pennsylvania.

Ohio Oil Company, Findlay, Ohio; lines in Ohio, Indiana and Illinois and a leased line into Pennsylvania.

Standard Oil Company of New Jersey; trunk lines from Unionville, on the state line of New Jersey and New York to the Bayonne refinery and the Hudson River; from Centerbridge, on the state line of New Jersey and Pennsylvania to the Bayway and Bayonne refineries; and from Fawn Grove on the state line of Maryland and Pennsylvania to the Baltimore refinery.

Standard Oil Company of Louisiana; principal office at Baton Rouge.

United States Pipe Line Company; lines in the northern counties of Pennsylvania entirely within the state; but these lines receive oil from West Virginia and Ohio.

STATE COMMISSIONS.

The Michigan commission has called a conference for September 18, at which the railways in the lower peninsula of the state will be called upon to revise their freight tariffs. It is said that this conference has been called because an order issued by the commission three years ago, looking to rate reductions, has not been complied with by all of the roads.

COURT NEWS.

It is understood that the government is not satisfied with the new contract which has been filed in court by the Terminal Railroad Association of St. Louis, setting forth the association's plans which have been designed to comply with the decree of the court requiring the association to admit to its privileges railways outside of the association doing business in St. Louis; and that when the district court shall have issued a final decree (in October), the attorney general will take an appeal to the Supreme Court. The new contract, as filed by the association, provides for the admission to membership of any railway on the same terms as the present members; permits any railway to use the terminal properties on equitable terms; leaves all companies free to use facilities outside the association, and abolishes unnecessary rebilling of freight at East St. Louis. As to modification in rates on freight from points in Illinois within 100 miles of St. Louis, the contract makes no specific provision. Judge Sanborn of the circuit court has denied the application of the attorney-general asking to have four circuit judges pass upon the plan of reorganization. Judge Sanborn's order leaves jurisdiction over the reorganization in the hands of Judge Trieber of the district court.

TELL-TALE SIGNALS IN GERMANY.—An apparatus which registers all cases of engine drivers running past stop signals, and sounds an alarm at the next station, has been installed on a portion of one of the German state railways. Regulations have also been framed which order any stationmaster on hearing such alarm to await the arrival of the train and immediately to question the engine driver. His explanation is to be recorded verbatim, and whether satisfactory or unsatisfactory in the opinion of the stationmaster is to be forwarded to the superintendent.

RAILWAYS NEEDED IN HONDURAS.—Railways are badly needed in Honduras to develop the resources, and so far there is little possibility that the concessions granted during the last session of congress will be of benefit to the country generally, as these lines will only run through the banana lines. A railway is particularly needed between the Atlantic and the Pacific coasts and also between Amapala and Tegucigalpa, the capital, about 90 miles. Hitherto the government has received no definite proposal for such a line, although it has expressed its willingness to grant such a concession on liberal terms.

NEW STEEL PLANT FOR NEW SOUTH WALES.—There is a scheme for establishing extensive iron and steel works at Newcastle, New South Wales. The manager of the Broken Hill Proprietary Company recently had an interview with the minister of public works with the view of obtaining government assistance chiefly in dredging the river, the erection of wharves, land reclamation and putting the dilapidated railway into working order. The government had thoughts of establishing similar works, but private enterprise has acted while the government thinks. It is probable that now the company has come forward first every encouragement and assistance will be given by the government.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. H. Clarke, general counsel of the New York, Chicago & St. Louis, with office at Cleveland, Ohio, has resigned, effective October 1.

G. A. Abramson has been appointed auditor of freight accounts of the Oregon-Washington Railroad & Navigation Company, with office at Portland, Ore.

F. G. Millen, chief clerk in the secretary's office of the Canadian Pacific, has been appointed assistant treasurer, with office at Montreal, Que., succeeding E. Alexander, promoted.

J. C. Williams, who has been for several years in the office of President W. W. Finley, of the Southern Railway, has been appointed assistant to president, in general charge of the department of farm improvement work, with headquarters at Washington, D. C.

President William C. Fordyce of the Scott City Northern announces the following appointments: William C. Fordyce, president, at St. Louis, Mo., succeeding B. M. McCue, resigned; Frank S. Yantis, vice-president, at Scott City, Kan., succeeding E. A. Tennis, resigned; Ralph W. Hoskinson, secretary, at Garden City, Kan., succeeding S. Rankin, resigned; M. F. Bayard, treasurer, at St. Louis, Mo., succeeding H. E. Hedlund, resigned; W. V. Delahunt, general solicitor, at St. Louis, Mo.; Albert Hoskinson, general attorney, at Garden City, Kan.

Ernest Alexander, whose appointment as assistant secretary of the Canadian Pacific, with headquarters at Montreal, Que., has been announced in these columns, was born December 8, 1862, in Yorkshire, England, and was educated in the public schools and at Collegiate Institute, Hamilton, Ont. He began railway work with the Grand Trunk in 1882, at Hamilton, and in 1893 entered the service of the Canadian Pacific, as private secretary to Sir William Van Horne, then president, remaining in that position until his retirement in 1899. Subsequently, he held various positions in the office of Sir Thomas Shaughnessy, who succeeded to the presidency. On July 1, 1908, he was appointed assistant treasurer of the Canadian Pacific, which position he held at the time of his recent appointment as assistant secretary, as above noted.

Anton Leroy Ungewitter, whose appointment as assistant to the president of the Toledo, St. Louis & Western, with office at Toledo, Ohio, has been announced in these columns, was born February 15, 1880. He was educated in the common schools and business college at Chicago, graduating in 1894. In November of the following year Mr. Ungewitter began railway work as a stenographer to the assistant trainmaster of the Lake Shore & Michigan Southern, and four years later he was made stenographer to the trainmaster of the same road. He was claim agent from January to December, 1901; was then made clerk to the general superintendent, and was made chief clerk to the superintendent of the Indiana, Illinois & Iowa, now the Chicago, Indiana & Southern, at Kankakee, Ill., in March, 1905. In May of the following year he was transferred to Gibson, Ind., as chief clerk to the superintendent of the C. I. & S. and the Indiana Harbor Belt. Mr. Ungewitter was made chief clerk to the vice-president of the Toledo, St. Louis & Western and the Chicago & Alton at Chicago in July, 1908, which position he held until the separation of those lines, and, effective September 1, 1912, he was made assistant to the president of the Toledo, St. Louis & Western, as stated above.

Operating Officers.

R. R. Hobbs has been appointed superintendent of telegraph of the Louisville & Nashville, with office at Louisville, Ky.

A. F. Cox has been appointed terminal trainmaster of the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa, a new position.

B. H. Crary has been appointed general superintendent of the Rapid City, Black Hills & Western, with office at Rapid City, S. D., succeeding H. A. Brome, resigned.

The Chicago, Burlington & Quincy, as noted elsewhere, has appointed three train rule examiners: S. H. Shults and C. T. Salisbury, with headquarters at Galesburg, Ill., and C. P. Philbrick, at Wymore, Neb.

E. L. Martin has been appointed assistant superintendent of Morgan's Louisiana & Texas Railroad & Steamship Company and the Louisiana Western, with office at Lafayette, La., succeeding Lewis Mims, promoted.

Robert Royal Sutherland, who has been appointed superintendent of the Kansas City Southern, with office at Texarkana, Tex., as has been announced in these columns, was born September 18, 1859, at New London, P. E. I., Canada, and was educated at the Scotsburn Grammar School, Nova Scotia. In January, 1873, he began railway work with the Union Pacific. Until 1881 he was consecutively telegraph messenger, station helper, track laborer, clerk, telegrapher and station agent, and from 1881 to 1890 he was traveling auditor, chief despatcher, trainmaster and assistant superintendent. For eight years from 1890 he was superintendent. In 1898 he left the Union Pacific, and during the next twelve years he was with the Chicago, Rock Island & Pacific, the Chicago,

Cincinnati & Louisville, and the Denver & Rio Grande, as trainmaster, assistant superintendent and superintendent. In September, 1910, he went with the Kansas City Southern as trainmaster at Shreveport, La., which position he held at the time of his recent promotion to superintendent at Texarkana.

Charles Ware, who has been appointed general manager of the Union Pacific, with office at Omaha, Neb., as has been announced in these columns, was born January 31, 1863, at Jonesboro, Ill.

He was educated in the public schools at Jonesboro and the Southern Illinois Normal University at Carbondale, Ill. Mr. Ware began railway work in 1880 with the Mobile & Ohio, and was subsequently operator, trick despatcher and chief despatcher on the Southern Pacific in Arizona and the Chicago & North Western in Iowa. He went with the Union Pacific in 1890, and has been in continuous service on that road, first as trick despatcher, then chief despatcher, and in 1905 was made assistant superintendent of the Nebraska division at Omaha. Mr. Ware was promoted to general superintendent in March, 1910, and three months later, under the Hine system of organization, his title was changed to assistant general manager, from which position he has just been promoted to general manager. With Mr. Ware's appointment the position of assistant general manager (general superintendent) has been abolished and the duties assumed by the general manager.

H. M. Alexander, chief despatcher of the Missouri Pacific-Iron Mountain System at Concordia, Kan., has been appointed

acting trainmaster of the Northern division, with headquarters at Concordia. C. A. Peterson succeeds Mr. Alexander.

William F. Ray, superintendent of the Portland division of the Boston & Maine, at Boston, Mass., has been appointed general superintendent, with office at Boston, succeeding Charles E. Lee, resigned, to go with the Commercial Acetylene Company, as general manager, with office at New York; C. E. McMullin succeeds Mr. Ray; effective September 15.

N. L. Howard, trainmaster of the Centerville division of the Chicago, Burlington & Quincy at Centerville, Iowa, has been appointed trainmaster of the Galesburg division, with headquarters at Galesburg, Ill., succeeding W. T. Sadler, who has been made assistant superintendent of the La Crosse division, and C. F. Bowers, roadmaster of the Aurora division, succeeds Mr. Howard.

E. L. Magers, who was made superintendent of the Southwestern division of the St. Louis & San Francisco at Sapulpa, Okla., in July, has been transferred to Fort Smith, Ark., as assistant superintendent, incident to the return of H. H. Brown to service as superintendent at Neodesha, Kan. It was erroneously stated in our issue of last week that Mr. Magers had resigned.

E. L. Kemp, freight agent of the Illinois Central at Louisville, Ky., has been appointed assistant superintendent of the Kentucky division of that road, with office at Louisville. J. B. Thomas, chief despatcher at Louisville, has been appointed trainmaster of the Paducah division, and T. L. Downs has been appointed trainmaster of the Evansville division. Thomas Wilkes succeeds Mr. Thomas.

Traffic Officers.

Harry T. Duffy has been appointed division passenger agent of the Minneapolis, St. Paul & Sault Ste. Marie, with office at Portland, Ore., succeeding George S. Taylor.

L. S. McDonald has been appointed commercial freight agent of the Missouri Pacific-Iron Mountain system, with headquarters at Cairo, Ill., succeeding R. M. McWilliams, promoted.

J. W. McCann, soliciting freight agent of the St. Louis & San Francisco at New Orleans, La., has been appointed commercial agent, with office at New Orleans, succeeding N. C. Barnett, promoted; and C. J. Mazoletti succeeds Mr. McCann.

A. W. Reese, commercial agent of the St. Louis Southwestern at Los Angeles, Cal., has been appointed Pacific coast agent, with office at Los Angeles. H. R. Dorr has been appointed commercial agent, with office at San Francisco, Cal., succeeding G. L. Townsley, Pacific coast agent, resigned.

T. F. Conway, traveling freight agent of the Atchison, Topeka & Santa Fe Coast Lines at Los Angeles, Cal., has been appointed industrial agent, with office at Los Angeles, succeeding W. H. Daum, and C. K. Adams succeeds Mr. Conway. F. T. Mullen has been appointed traveling freight agent, with headquarters at San Bernardino, Cal.

H. J. Neff, commercial agent of the St. Louis & San Francisco lines at Corpus Christi, Tex., has been appointed general freight and passenger agent of the St. Louis, Brownsville & Mexico, with office at Kingsville, Tex., succeeding R. J. McLellan, resigned. J. W. Jacobs, traveling freight agent at Corpus Christi, succeeds Mr. Neff.

L. H. Saunders, traveling freight agent of the Missouri, Kansas & Texas of Texas, at Houston, Tex., has been appointed freight and ticket agent, with headquarters at Shreveport, La., succeeding W. C. Zehnder, assigned to other duties. W. V. Pittman, contracting agent at Houston, succeeds Mr. Saunders, and R. P. Buckingham, Jr., succeeds Mr. Pittman.

W. W. Blakely, commercial freight agent of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton at Memphis, Tenn., has been appointed division freight agent of the B. & O. S. W., with office at Louisville, Ky., succeeding J. M. Ryan, deceased. M. W. Waynesburg, commercial freight agent of both roads at New Orleans, La., succeeds Mr. Blakely, and Norton L. Jones succeeds Mr. Waynesburg.

The following officers, who have had jurisdiction over the Chicago & Alton and the Toledo, St. Louis & Western, will



R. R. Sutherland.



Charles Ware.

hereafter have jurisdiction over the latter road only: A. K. Handy, general eastern agent at New York City; R. M. Baumgardner, New England freight agent at Boston, Mass.; W. S. Turner, commercial agent at Little Rock, Ark.; L. B. Gerner, southwestern freight agent at Dallas, Tex.; H. W. Prickett, commercial agent at Salt Lake City; H. C. Weber, traveling freight agent at Toledo, Ohio; E. M. Davis, division freight agent at Frankfort, Ind.; J. A. Fitzpatrick, general agent in the traffic department at Los Angeles, Cal.; E. J. Naylor, general agent in the traffic department at San Francisco, Cal., and E. L. Browne, district passenger agent at Toledo, Ohio.

George A. Blair, whose appointment as general traffic manager of the Chicago & Alton, with office at Chicago, has been announced in these columns, began railway work as a bill clerk in the local freight office of the Ohio & Mississippi Valley, now part of the Baltimore & Ohio Southwestern, at Cincinnati, Ohio, and was subsequently traveling freight agent of the Atchison, Topeka & Santa Fe at the same place. In 1898 Mr. Blair went with the Chicago, Milwaukee & St. Paul, and he has been with that road ever since. Prior to December, 1906, he was commercial agent at Cincinnati, and was then transferred with the same title to Pittsburgh, Pa. He was appointed general eastern agent, with office at New York, in October, 1908, and in July, 1910, was promoted to assistant



G. A. Blair.

general freight agent at Chicago, which office he has just resigned to go with the Alton as general traffic manager.

Samuel F. Miller, who has been appointed general freight agent of the Chicago & North Western, with office at Chicago, as has been announced in these columns, was born at Wenona, Ill. He received a common school education. On July 21, 1881, Mr. Miller began railway work with the Chicago & North Western, and he has been in continuous service on that road. Until 1890 he was consecutively telegraph operator, cashier and station agent. He was then made traveling agent, and from 1896 to 1902 was general agent. In the latter year he was promoted to assistant general freight agent, and in 1906 he was made general freight and passenger agent of the lines west of the Missouri river at Omaha, Neb., from which position he was recently promoted to general freight agent of the entire system, with office at Chicago.

H. D. Luckett, commercial agent of the Southern Railway, at Charleston, S. C., has succeeded to the duties of H. M. Cobb, commercial agent at Charleston, promoted. L. M. Ansley succeeds Mr. Luckett. L. W. Sanderson, traveling freight agent at Nashville, Tenn., has been appointed commercial agent with office at Little Rock, Ark., succeeding Robert McMechan, resigned. H. W. Watson, traveling freight agent, at Albany, Ga., succeeds Mr. Sanderson. J. W. Sikes succeeds Mr. Watson. L. E. Reynolds has been appointed freight soliciting agent, with office at New Orleans, La. R. B. Arthur, freight soliciting agent at Augusta, Ga., has been appointed commercial agent, with office at Augusta. F. E. Harrison succeeds Mr. Arthur. B. W. Ingersoll has been appointed freight soliciting agent, with office at Birmingham, Ala., succeeding A. J. Ribe, assigned to other duties. J. H. McCabe has been appointed freight soliciting agent, with office at Richmond, Va. L. B. Harris, Greenville, S. C.; W. C. Stewart, Philadelphia, Pa., and William J. Fortune, Boston, Mass., have been appointed traveling freight agents.

Engineering and Rolling Stock Officers.

Alexander Bonnyman, until recently general manager of the Atlanta, Birmingham & Atlantic, is now chief engineer, with headquarters at Atlanta, Ga.

J. S. Golithon has been appointed master mechanic of the Bellingham Bay & British Columbia, with office at Bellingham, Wash., succeeding J. A. Haley, resigned.

J. D. Farrington has been appointed roadmaster of the Aurora division of the Chicago, Burlington & Quincy, with headquarters at Aurora, Ill., succeeding C. F. Bowers, promoted.

M. F. McCarra has been appointed master mechanic in charge of all equipment of the Louisiana Railway & Navigation Company, with office at Shreveport, La., succeeding T. Nicholson, resigned.

G. I. Evans, mechanical engineer of the Canadian Pacific, at the Angus shops, Montreal, Que., has been appointed superintendent of the locomotive shops at Angus, succeeding H. Osborne, promoted. W. H. Winterrowd succeeds Mr. Evans.

W. H. Williams, master mechanic of the Buffalo, Rochester & Pittsburgh at Du Bois, Pa., has been appointed master mechanic of the Buffalo and Rochester divisions, with headquarters at East Salamanca, N. Y., succeeding P. C. Zang, resigned.

F. G. Grinshaw, master mechanic of the West Jersey & Seashore and the Camden Terminal division of the Pennsylvania Railroad at Camden, N. J., has been appointed assistant engineer of motive power of the Western Pennsylvania division, with office at Pittsburgh, Pa.

Richard J. McComb, who has been appointed division engineer of the Wheeling & Lake Erie, with headquarters at Canton, Ohio, as has been announced in these columns, was born February 4, 1884, at New Castle, Pa. He attended the Pennsylvania State College from 1903 to 1905. Mr. McComb began railway work in September, 1902, with the Pennsylvania Railroad and after finishing college went with the Wheeling & Lake Erie at Canton as rodman. Two years later he became assistant engineer of the Youngstown Sheet & Tube Company at Youngstown, Ohio, and returned to the Wheeling & Lake Erie in September, 1908, as assistant engineer. In July, 1911, he was promoted to roadmaster of the Wheeling division at Dillonvale, Ohio, from which position he was again promoted in August, 1912, to division engineer of the Toledo division at Canton, as noted above.

Samuel Rockwell, whose appointment as consulting engineer of the Lake Shore & Michigan Southern, with headquarters at Cleveland, Ohio, has been announced in these columns, was born

on February 20, 1847, at Brooklyn, N. Y., and graduated from Sheffield Scientific School, Yale University, in 1873. Previous to graduation, he had been a flagman, in 1864, on a locating party for the Adirondack Railway, now a part of the Delaware & Hudson, and in 1871 was a levelman on the St. Paul & Pacific, now a part of the Great Northern. He was subsequently promoted to resident engineer on construction work. In 1872, he was engaged on location work for the Green Bay & Lake Pipin, now a part of the Green Bay & Western. The following year he went to the

Delaware, Lackawanna & Western, at Hoboken, N. J., and for about four years was resident engineer on the Bergen Hill tunnel, and on other work. From 1877 to 1885, he was out of railway service, principally engaged in contracting, and in municipal and water works engineering. He was a locating and construction engineer from 1885 to 1887 on the St. Paul, Minneapolis & Manitoba, now a part of the Great Northern. In 1888, he was appointed chief engineer of the Eastern Minnesota, now a part of the Great Northern, and in 1890 made surveys in California for an extension of the Santa Fe to the Pacific coast. The fol-



S. Rockwell

l owing year he was appointed chief engineer of the Duluth & Winnipeg, now a part of the Great Northern, and in September of the same year he was appointed engineer of the Michigan Southern division of the Lake Shore & Michigan Southern. In 1900, he was made principal assistant engineer of the same road. He was promoted in 1904 to assistant chief engineer, and the following year was made chief engineer, which position he held at the time of his recent appointment as consulting engineer.

J. W. Brewer, whose appointment as superintendent of the Mt. Clare, Baltimore, Md., shops of the Baltimore & Ohio, has been announced in these columns, was born September 6, 1880, at Grafton, W. Va. He began railway work on September 24, 1895, as an engine cleaner on the Baltimore & Ohio, and has been in the service of that road ever since. From November, 1896, to November, 1900, he was machinist's apprentice, and in November, 1900, was appointed machinist. Three years later he was made roundhouse foreman, and in 1904, was appointed gang foreman of erecting shop. He was promoted in 1907 to erecting shop foreman, in 1908, he was appointed assistant master mechanic, and two years later he was made master mechanic, which position he held at the time of his recent promotion as superintendent of shops, as above noted. He will also perform the duties of master mechanic as heretofore. The Mount Clare shops are the principal ones on the Baltimore & Ohio system. About all of the heavy repair work to locomotives and cars, from all lines, is done at Mount Clare, and about 3,000 skilled mechanics and shopmen of various grades are steadily employed at Mount Clare.

George C. Cleveland, who has been appointed chief engineer of the Lake Shore & Michigan Southern, with office at Cleveland, Ohio, as has been announced in these columns, was born in 1854, at Dover, Mass. He began railway work in 1873 as rodman and instrumentman on the Providence & Springfield, now a part of the New York, New Haven & Hartford. From 1874 to 1879, he was employed by the city of Boston, making preliminary and location surveys, and on the construction of an aqueduct from Framingham to Boston. He went to the Mexican Central in 1880, and was engaged in making preliminary and location surveys, until his appointment as assistant chief engineer of the company, in charge of heavy construction work from the city of Mexico to and through the Zaca-tecas mountains. From 1885 to 1891, he was engaged in a general engineering business at Los Angeles, Cal., and built suburban street railways out of that place. In 1891, he was appointed principal assistant engineer of the Lake Shore & Michigan Southern; for the past seven years he has been assistant chief engineer in charge of maintenance and construction work.

Special Officers.

H. S. Mikesell has been appointed assistant to the manager of the mining department of the Rock Island Lines, with office at Chicago.

OBITUARY.

Augustus Newman, formerly industrial agent of the Chicago Terminal Transfer Railway, died at his home in Chicago on September 9, at the age of 72 years. Mr. Newman began railway work in 1862 with the Chicago & Alton. From July, 1871, to October, 1900, he was assistant general freight agent of that road, and from 1903 to 1910 he was industrial agent of the Chicago Terminal Transfer.



G. C. Cleveland.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE ERIE has ordered 5 mikado locomotives from the Baldwin Locomotive Works.

THE LEHIGH VALLEY has ordered 7 mikado locomotives from the Baldwin Locomotive Works.

THE ILLINOIS SOUTHERN has ordered 2 mikado locomotives from the Baldwin Locomotive Works.

THE MUD BAY LOGGING COMPANY has ordered 1 mikado locomotive from the Baldwin Locomotive Works.

THE GREAT NORTHERN has ordered 10 six-wheel switching locomotives from the Baldwin Locomotive Works.

THE WASHINGTON & OLD DOMINION has ordered 2 consolidation locomotives from the Baldwin Locomotive Works.

THE INTERNATIONAL PAPER COMPANY has ordered 1 six-wheel switching locomotive from the Baldwin Locomotive Works.

THE HARDAWAY CONTRACTING COMPANY has ordered 1 four-wheel switching locomotive from the Baldwin Locomotive Works.

THE CHICAGO, BURLINGTON & QUINCY has ordered 10 six-wheel switching locomotives from the Baldwin Locomotive Works.

THE RURAL VALLEY has ordered 1 consolidation locomotive from the American Locomotive Company. The dimensions of the cylinders will be 21 in. x 28 in.; the diameter of the driving wheels will be 57 in., and the total weight in working order will be 188,000 lbs.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 10 consolidation locomotives from the American Locomotive Company. The dimensions of the cylinders will be 25 in. x 30 in.; the diameter of the driving wheels will be 63 in., and the total weight in working order will be 225,000 lbs.

CAR BUILDING.

THE LEHIGH & NEW ENGLAND is in the market for from 300 to 500 freight cars.

THE CENTRAL MORON, Cuba, has ordered 40 cane cars from the Magor Car Company.

THE CHICAGO, BURLINGTON & QUINCY has ordered 1,000 gondola cars from the American Car & Foundry Company.

THE WABASH is in the market for 500 hopper car bodies and not for 500 hopper cars as was mentioned in the *Railway Age Gazette* of August 30.

IRON AND STEEL.

THE PERE MARQUETTE has ordered 9,000 tons of rails from the Cambria Steel Company.

THE HARRIMAN LINES have ordered 17,000 tons of rails from the Carnegie Steel Company. Of the total, 12,000 tons are for the Southern Pacific, and 5,000 tons are for the Union Pacific.

GENERAL CONDITIONS IN STEEL.—The demand for steel for early delivery is more urgent than it has been at any time since the improvement began. Certain western roads, not being able to obtain material in their respective territories, are negotiating with eastern mills, notwithstanding the difference from \$1.50 to \$2 in freight. The September government crop report is regarded as assurance that the present period of prosperity will last at least a year.

NEW RAILWAY HOTEL IN PARIS.—The Paris-Lyon Mediterranean Railway, France, has recently opened a new hotel in Paris, close to its terminus in the rue de Lyon. The new hotel bears the name of the Paris-Lyon-Palace.

Supply Trade News.

Richard J. Sheridan, formerly assistant to H. A. Fabian, manager of purchases and supplies of the New York, New Haven & Hartford, with office in Boston, Mass., has been made eastern agent of the Chicago Railway Equipment Company, succeeding C. P. Williams, resigned to go to the National Lock Washer Company, Newark, N. J., with office in Chicago.

Stewart D. Anderson, eastern representative of the Standard Railway Equipment Company, Pittsburgh, Pa., with office in New York, and formerly with the Hutchins Car Roofing Company, Detroit, Mich., with office in Chicago, died in Richmond, Va., on September 5. Mr. Anderson was born in Buffalo, N. Y., in 1848, and had been with the Standard company for about 11 years. He was a member of the New York Railroad Club.

Charles P. Williams, who has been eastern agent for the Chicago Railway Equipment Company, with office in New York, has resigned to become connected with the National Lock Washer Company, Newark, N. J., with headquarters in the Chicago office. Mr. Williams has formerly been connected with the Chicago, Milwaukee & St. Paul, the Michigan Central, the Canadian Pacific, and the Minneapolis, St. Paul & Sault Ste. Marie, and with the M. J. Holden Company of Montreal, Que.

The officers of the Hall Railway Signal Company, New York, are as follows: President, J. J. Kennedy; vice-president, William P. Hall; treasurer, N. J. Brown; secretary, E. P. Goetz. Mr. Kennedy was vice-president and treasurer of the Hall Signal Company before its reorganization and Mr. Hall was president of that company. Mr. Brown is secretary of the Empire Trust Company, New York, and Mr. Goetz is associated with J. S. Bache & Co., New York, and was secretary of the readjustment committee of the Hall Signal Company.

E. Harrison Symington, western agent for the T. H. Symington Company, Baltimore, Md., with office in Chicago, died in Baltimore on September 5, after undergoing two operations for internal injuries. About five years ago Mr. Symington sustained severe injuries from a fall from his horse, and the recent operations were due to that accident. He was 34 years old and had graduated from Lehigh University in 1898 as a mechanical engineer. He was a member of the Saddle and Cycle, the University, the Chicago and the Athletic clubs in Chicago, and of the Baltimore Country Club and the Maryland Club in Baltimore.

Charles E. Lee, general superintendent of the Boston & Maine, with office in Boston, Mass., has resigned to go to the Commercial Acetylene Company, New York, as general manager, with office in New York. Mr. Lee was born on August 19, 1860, and was educated in the public schools. He began railway work in 1877 as an operator on the Boston, Clinton, Fitchburg & New Bedford, now a part of the New York, New Haven & Hartford. From 1879 to December, 1896, he was operator and train dispatcher on the Worcester, Nashua & Rochester, and its successor, the Boston & Maine. In December, 1896, he was appointed superintendent of the Worcester, Nashua & Portland division of the Boston & Maine, and in August, 1903, was appointed assistant general manager. On September 1, 1906, he was made general superintendent of the same road.

The Case Crane & Engineering Company, Columbus, Ohio, has been incorporated and has taken over the plant and business of the old Case Crane Company, of Columbus. No connection exists between the new company and the stockholders and officers of the old company. Paul T. Norton, who has been associated with the Jeffery Manufacturing Company, has been made president and general manager of the new company. Among the directors and stockholders are S. P. Bush, president of the Buckeye Steel Castings Company, Columbus; J. F. Stone, president of the Seagrave Company; J. A. Jeffery, president of the Jeffery Manufacturing Company; Colonel James Kilbourne, president of the Kilbourne & Jacobs Manufacturing Company; O. A. Miller, president of the Ohio Paper Company, and J. H. Frantz, vice-president of the Columbus Iron & Steel Company. The company will start business with a large amount of cash working capital in addition to the assets of the old company and without any bonded debt or liabilities.

Railway Construction.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded to Walter H. Denison, of Wagoner, Okla., for 98 miles of grading between Lovett and Texico, Tex.

CANADIAN PACIFIC.—The report of this company for the year ended June 30, 1912, shows that the company has 1,246.2 miles under construction, on which work is now under way as follows:

Ontario Division.

Name.	Miles.
Georgian Bay & Seaboard: Coldwater, Ont., southeast to Bethany	76.0
South Ontario & Pacific: Guelph Junction, southeast to Hamilton	16.2
Campbellford, Lake Ontario & Western: Glen Tay, southwest to Agincourt.....	184.0

Manitoba Division.

Virden, Man., northwest to Macauley.....	35.4
Souris branch and extensions: Tilston, westerly to Alida	24.0
Boisevain, northwest to Lauder.....	37.0

Saskatchewan Division.

Moose Jaw branch: Outlook, Sask., west to Rosetown	50.0
Moose Jaw, westerly	35.0
Kerrobert branch: Kerrobert, northeast	36.0
Weyburn branch: West of mile post 52 to 172	120.0
Stirling, east	25.0
Estevan branch: Estevan, northwest to Forward	55.0
Swift Current branch, southeasterly	45.0
Wilkie branch, southeasterly	35.0
Wilkie branch, northwesterly	32.0

Alberta Division.

Bassano branch: Bassano, Alta., to Standard	36.0
Swift Current branch, northwest	115.0
Suffield branch, southwest	55.0
Alberta Central branch: Red Deer, west	64.0
Crow's Nest Pass line: Waldo branch, Galloway to Waldo	12.4
Calgary & Edmonton: Lacombe-Coronation, east	62.0

British Columbia Division.

Three Forks, B. C., east to Bear Lake	5.0
Port Moody	3.2
Kootenay Central: Wardner, north	46.0
Golden, south	42.0

Total 1,246.2

An officer writes that a contract has been given to Grant, Smith & McDonnell, Spokane, Wash., for double-tracking work between Hammond, B. C., and Ruby Creek.

COLUMBUS, MEMPHIS & GULF.—An officer writes that the plans call for building from Okolona, Miss., southeast via Aberdeen, Columbus and Pickensville, Ala., to Aliceville, 70 miles, and that the prospects of building are good. The cut and fill work involves handling about 5,000 cu. yds. a mile. The maximum grades will be 0.5 per cent., and maximum curvature 2 deg. There will be four trestles and five stations. The company expects to develop a traffic in cotton and timber products. G. T. Heard, president, Brooksville, Miss.

DODGE CITY & CIMARRON VALLEY.—Ransom & Crook, Ottawa, Kan., have been awarded the contract for 62 miles of grading in Grant, Stevens and Morton counties, Kan. This company has just finished the work on a contract for grading from Dodge City, Kan., to Satanta, Okla.

GREAT NORTHERN.—According to press reports, bids are being asked for building a 41-mile line in British Columbia from Coalmont, B. C., to Coquahalla.

The cutoff from Fargo, N. Dak., to Surrey, 225 miles, was opened for business September 1. (August 9, p. 271.)

HASTINGS & NORTHWESTERN.—See Union Pacific.

MEDFORD & CRESCENT CITY.—Incorporated in Oregon, with \$50,000 capital, by residents of Medford, Ore. The plans call for building from Medford, west via Ruch to Kerby, thence southwest via Deering, to Crescent City, Cal., about 90 miles. W. H. Gore, L. McCormack, E. C. Burgess, Jr., and S. Patterson, all of Medford, are incorporators.

MISSOURI, OKLAHOMA & GULF.—Work is well under way, it is said, on the extension north from Wagoner, Okla., to Joplin, Mo., 120 miles. It is understood that construction work will be started before November 1, on the branch from Henryetta, Okla., west to Oklahoma City.

An officer is quoted as saying that plans have been made

for building an extension from Denison, Tex., south to Dallas, with a branch west to Fort Worth.

MORGANTOWN & DUNKARD VALLEY (Electric).—An officer writes that the plans call for building from Morgantown, W. Va., north via Randall, thence west via Cassville, and northwest via Bentress to Blacksville, 22½ miles. Track has been laid on eight miles from Morgantown to Cassville, and contracts will soon be let for work on the rest of the line. The excavation work involves handling about 14,000 cubic yards a mile. The maximum grades will be 1½ per cent., except at Cassville, on a short distance where the grade will be 3½ per cent., and maximum curvature 16 deg. There will be a number of steel bridges, varying in size from 40 ft. to 130 ft. each, and two small trestles. The company expects to develop a traffic in passengers, express matter, local freight and eventually coal. G. B. Hartley, chief engineer, Morgantown.

MOUNT IDA, OUACHITA VALLEY & HOT SPRINGS.—An officer writes that the plans call for building from Mount Ida, Ark., south to a point 5½ miles north of Caddo Gap. The work is to be carried out by local labor under the direction of C. C. Godman, chief engineer. There will be three trestles on the line. The company expects to develop a traffic in lumber, cotton, etc. G. Cox, president, Mount Ida. (August 30, p. 409.)

NEW ORLEANS GREAT NORTHERN.—An officer is quoted as saying that an extension is to be built from Jackson, Miss., north towards Memphis, Tenn.

OTTAWA & ST. LAWRENCE (Electric).—Construction work is to be started this month from Ottawa, Ont., south to Morrisburg. A branch is to be built later to Cornwall, and several other lines are under consideration to connect a number of the smaller Canadian cities in that section. The company has a capital of \$4,000,000, and was financed by J. A. Morden & Company, Toronto. Henry F. Darrell, Toronto, is the promoter. (April 26, p. 982.)

PENNSYLVANIA LINES WEST.—Work is now under way, extending the tracks in the yard at Logansport, Ind. The cost of the improvements will be about \$100,000.

PERRY, MACON & NORTHERN.—This company is to be incorporated in Georgia, with \$100,000 capital, to build from Perry, Ga., north to Macon, 30 miles. A promoter writes that the prospects of building the line are good, and that surveys are now being made. William C. White, Macon; C. E. Brunson, and W. F. Staten, Valdosta, are interested.

QUANAH, ACME & PACIFIC.—According to press reports, a contract has been given to the Texas Building Company, Fort Worth, Tex., to build the 40-mile extension from Paducah, Tex., west. (September 6, p. 453.)

ST. LOUIS, BROWNSVILLE & MEXICO.—According to press reports, work is now under way on the branch from Heyser, Tex., on the Port O'Connor branch, to Austwell on San Antonio Bay. Plans have been made to build a branch from Sinton to Port Aransas, 32 miles. (May 31, p. 1221.)

ST. PETERSBURG & GULF.—According to press reports, this company is now at work building an eight-mile line from St. Petersburg, Fla., to Boca Ceiga bay. B. M. Latham, chief engineer, St. Petersburg.

SOUTHERN NEW ENGLAND.—The Southern New England, a subsidiary of the Grand Trunk Railway System, is making rapid progress on the new line under construction between Palmer, Mass., and Providence, R. I. Aside from certain isolated parcels in the towns of Southbridge and Webster, Mass., practically all of the necessary right-of-way has been acquired. Arrangements are also being perfected to take care of the crossing of the Harbor Junction branch of the New York, New Haven & Hartford in Rhode Island. In Massachusetts the grading in the vicinity of Palmer is practically completed up to Monson Creek bridge. Good progress is also being made in the vicinity of East Brimfield and Southbridge, Mass., but very little grading has been done on the section in the vicinity of West Brimfield. Grading on the freight line in Providence is probably 30 per cent. completed and the work is progressing fairly well. Work has been commenced on the masonry at the power house viaduct near Palmer, Mass., and the first concrete on the bridges near West Brimfield was laid during the week of September 1. The Marsch-Cleary-White Company, which has the sub-contracts for

the bridge masonry in the vicinity of Southbridge, is getting its plant in readiness and excavation for the culverts and retaining walls near Southbridge has been started. A temporary frame trestle has been completed at station 3029, near Blackstone, and a permanent trestle is being framed for erection at a point one-half mile east of the temporary trestle. Laying concrete for the viaducts in Rhode Island has been started and the work is progressing rapidly. During the first week in September there were 19 steam shovels on the line between Palmer and Providence, 14 of which were in operation. Nine out of 12 concrete outfits on the line were operating. The contractors' force at present totals 1,675 men. Concrete is being laid at the rate of about 950 cu. yds. per week and the grading is progressing at the rate of 350,000 yds. per month.

UNION CYPRESS COMPANY'S LINE.—Work is nearing completion on a logging line from this company's sawmill at Melbourne, Fla., west to timber lands, 18 miles. D. F. Clark, president, Melbourne.

WASHINGTON ELECTRIC.—Incorporated in Oregon, with \$1,000,000 capital to build from Vancouver, Wash., north to Tacoma. The incorporators include H. C. Coffman, Chehalis; C. H. Berryman, and R. B. Montague.

UNION PACIFIC.—A contract has been given to Kilpatrick Brothers & Collins, of Omaha, Neb., and Beatrice, to build the Hastings & Northwestern from Hastings, Neb., northwest to Gibbon, 26 miles. (Aug. 2, p. 228.)

WICHITA FALLS ROUTE.—According to press reports, work has been finished by the Wichita Falls & Northwestern on the extension to Forgan, Beaver county, Okla., which is 85 miles northwest of Woodward. It is understood that the line will eventually be extended north into Kansas. (Jan. 26, p. 177.)

WICHITA FALLS & NORTHWESTERN.—See Wichita Falls Route.

RAILWAY STRUCTURES.

BOSTON, MASS.—The Boston & Albany is to build new bridges to carry the tracks over highways in Westboro, Roxdale, Palmer (two), Springfield, Pittsfield and Richmond. These bridges are heavier than those which they replace, the increase in strength being necessary on account of the increased weight of the loads.

EAST WACO, TEX.—The Missouri, Kansas & Texas expects to begin work shortly on car repair shops and a water treating plant.

INDIANAPOLIS, IND.—The Pennsylvania Lines have asked bids on a new freight house.

The Pennsylvania Lines have submitted plans to the city for a concrete and steel 20-stall roundhouse.

MANLY JUNCTION, IA.—The Chicago, Rock Island & Pacific has awarded the contract for a 20-stall roundhouse.

MAPLESVILLE, ALA.—The Southern Railway has given a contract to H. F. Elliott, Hickory, N. C., for building a combination station, a cotton platform, and making track changes at Maplesville, the work is to be started at once, and will be pushed to completion. The original plan of building a joint station with the Mobile & Ohio has been abandoned.

MORGANTOWN, W. VA.—See Morgantown & Dunkard Valley (Electric) under Railway Construction.

OKOLONA, MISS.—See Columbus, Memphis & Gulf under Railway Construction.

PALMER, MASS.—See Boston, Mass.

PITTSFIELD, MASS.—See Boston, Mass.

RICHMOND, MASS.—See Boston, Mass.

ROCHDALE, MASS.—See Boston, Mass.

SPRINGFIELD, MASS.—See Boston, Mass.

SWEETWATER, TEX.—The Kansas City, Mexico & Orient has filed plans with the Texas railway commission for a new passenger station to be built within three months.

TACOMA, WASH.—The Chicago, Milwaukee & Puget Sound is to begin work shortly on a new freight warehouse, 430 ft. x 175 ft.

WESTBORO, MASS.—See Boston, Mass.

Railway Financial News.

BOSTON ELEVATED.—Judge Colt, in the United States district court, on September 5 sustained the demurrer of the West End Street Railway and dismissed the suit brought by Anna Young as the holder of \$5,000 bonds of the West End company to prevent the merger of that company with the Boston Elevated. The court found that the legislature has the right to pass a law providing for the transfer of the property of one solvent corporation to another. The effect of the transaction is simply a change of name, as the Boston Elevated assumes all the liabilities and indebtedness of the West End. The plaintiff contended that the merger would impair the obligation of her contract with the West End company.

BURR'S FERRY, BROWNDL & CHESTER.—This company will be taken over by the Southern Pacific. The road runs from Rockland, Tex., to Turpentine, 11 miles.

CANADIAN PACIFIC.—See Quebec Central.

CHICAGO GREAT WESTERN.—See Wisconsin, Minnesota & Pacific.

DENVER, NORTHWESTERN & PACIFIC.—Control of this company was acquired by Newman Erb at the meeting held in New York, September 9. It is planned to form a new company, which will bid in the property of the D. N. & P. at the foreclosure sale, and Mr. Erb will receive as a bonus a majority of the capital stock of the new company. The receivers have made application to the courts for permission to sell \$300,000 receivers' certificates, and it is understood that an additional \$200,000 receivers' certificates will be sold later. Mr. Erb and his associates will take all these certificates. After the new company has been formed new securities will be issued, which will be received by the holders of the \$3,500,000 notes in exchange for those they now hold. Of the new securities the Erb syndicate will take \$1,000,000 bonds at about 85. A bonus of 51 per cent. of the stock will go with these bonds and will give the syndicate control of the road.

MIDLAND VALLEY.—Stockholders will vote on October 2 on the question of issuing \$1,500,000 preferred stock. The amount authorized is now \$10,000,000 and the amount outstanding, \$8,013,000.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—According to press reports, this company has bought the Wisconsin & Michigan. The W. & M. runs from Peshtigo Harbor, Mich., northward, 76 miles, to Iron Mountain, Mich., with branches aggregating 50 miles additional.

NATIONAL RAILWAYS OF MEXICO.—This company has called for payment \$39,000 equipment and collateral 5 per cent. bonds, second series, dated October 2, 1899, of the Mexican Central Railway. Payment at par and interest will be made on October 1 at either the Old Colony Trust Company, Boston; the National Railways of Mexico, New York; or Glyn, Mills, Currie & Company, London, England.

NEW YORK CENTRAL & HUDSON RIVER.—See Rutland.

NEW YORK, NEW HAVEN & HARTFORD.—See Rutland.

NORFOLK & WESTERN.—N. D. Maher, of Roanoke, Va. second vice-president and general manager of the road, has been made a director, succeeding Henry Fink, deceased.

QUEBEC CENTRAL.—According to press reports, the agreement for leasing this line to the Canadian Pacific will take effect January 1, 1913, and the 7 per cent. income bonds, now dependent for their interest upon earnings, will then be converted into 5 per cent. 50-year bonds. These bonds will be guaranteed principal and interest by the Canadian Pacific. In compensation for the reduction of interest, the bondholders will receive a cash bonus of 10 per cent.

RUTLAND.—Complaint has been made to the New York Public Service Commission, Second district, by a committee including Tompkins C. Delavan, John F. Calder, Ralph L. Shainwald and George N. Towle, representing holders of \$750,000, par value, of the stock of the Rutland, asking the commission to cancel the purchase by the New York, New Haven & Hartford from the New York Central & Hudson River of 20,035½ shares of Rutland stock. The petition calls atten-

tion to the fact that on July 11, 1912, Justice Gerard, of the Supreme Court, made an order granting an injunction restraining the New York Central and the New Haven from transferring or receiving shares of stock. In the opinion Justice Gerard held that the Rutland and the New Haven were competing lines.

ST. LOUIS & SAN FRANCISCO.—This company will issue \$2,600,000 6 per cent. notes, due September 1, 1914. These notes will be secured by pledge with the Equitable Trust Company of the following collateral: \$3,609,046 New Orleans, Texas & Mexico 6 per cent. certificates of indebtedness; \$2,000,000 New Orleans, Texas & Mexico capital stock (the entire issue); \$1,400,000 Kirby Lumber Company 7 per cent. preferred stock; \$600,000 San Benito & Rio Grande Valley bonds, when issued, and authorized by the Texas railway commission; and \$49,100 of the San Benito & Rio Grande Valley stock. The proceeds of this sale will be used to reimburse the St. Louis & San Francisco for expenditures on the New Orleans, Texas & Mexico division, which have aggregated \$5,609,046.

Application has been made by the company to the Texas railway commission for permission to issue and register \$94,000 bonds, secured by the Brownwood, North & South Texas, which was recently constructed, and which runs from Brownwood, Tex., to May.

SOUTHERN PACIFIC.—See Burr's Ferry, Browndel & Chester.

TENNESSEE NORTHEASTERN.—This company is now selling in France \$750,000 of its \$2,600,000 first mortgage 5 per cent. bonds, due April 1, 1949.

WESTERN ALLEGHENY.—The common pleas court at Pittsburgh, Pa., on September 5 authorized Receiver Ely to issue not over \$50,000 6 per cent. receiver's certificates.

WISCONSIN, MINNESOTA & PACIFIC.—The Chicago Great Western, which owns the entire capital stock and operates the road under lease, will make no further advances to meet the interest on the \$6,232,000 first mortgage 4 per cent. bonds of the Wisconsin, Minnesota & Pacific. President Felton, of the Chicago Great Western, said in part: "The gross earnings of the Wisconsin, Minnesota & Pacific have been insufficient to cover the expenses of operation and maintenance, taxes and the interest on its bonds. The fact is that the road is a drain upon the earnings of the Great Western company, and the latter has decided that it will not make further advances to pay interest on the Wisconsin, Minnesota & Pacific bonds as it is under no obligation to do so."

TRAFFIC CONGESTION IN INDIA.—According to the *Indian Railway Gazette*, traffic congestion in India has been so severe that the Great Indian Peninsular Railway refused to receive shipments for its Bombay termini for nearly two weeks in order to relieve the congestion.

INDIAN LAUNDRY CAR.—Attached to the auxiliary train, which accompanied the special train used by the royal party in India at the time of the Delhi Durbar, was a special laundry car 62 ft. long and 9 ft. 6 in. wide. This car carried a boiler, wash tubs, etc., at one end, and ironing boards, with heaters, etc., at the other end. The central portion of the car was used for drying and storing.

CAR SHORTAGE IN SAXONY.—There has been a heavy increase in the freight revenues of the Saxon State Railways, which was accompanied by a heavy car shortage. This shortage was not caused so much by reduced orders for equipment as by the unusually hot summer and drout which made many of the water transportation routes unavailable for the movement of freight, and consequently the burden of transportation was thrown entirely on the railways, which found themselves unable to meet the demand for freight cars.

CHINESE RAILWAY DEVELOPMENT.—Press despatches from Pekin this week say that the Chinese government has authorized Dr. Sun Yat Sen to establish a railway corporation to build an elaborate system of national railways. Companies made up of both Chinese and foreign interests will be granted concessions for periods of about 40 years, so made that at the end of that time the railways shall revert to the government. Dr. Sun proposes a scheme under which the whole of China proper shall be open to foreign residence.

ANNUAL REPORT

CANADIAN PACIFIC RAILWAY COMPANY—THIRTY-FIRST ANNUAL REPORT.

To the Shareholders.

The accounts of the Company for the year ended June 30th, 1912, show the following results:	
Gross Earnings	\$123,319,541.23
Working Expenses	80,021,298.40
Net Earnings	\$43,298,242.83
Net Earnings of Steamships in excess of amount included in monthly reports	1,104,448.79
Deduct Fixed Charges	\$44,402,691.62 10,524,937.49
Surplus	\$33,877,754.13
Deduct amount transferred to Steamship Replacement Account	\$1,000,000.00
Contribution to Pension Fund	125,000.00
	1,125,000.00
	\$32,752,754.13
From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent., paid April 1st, 1912.....	\$1,258,333.32
And three quarterly dividends on Ordinary Stock of 1½ per cent. each, paid January 2nd, 1912, April 1st, 1912, and June 29th, 1912	9,450,000.00
	\$10,708,333.32
	\$22,044,420.81
From this there has been declared a second half-yearly dividend on Preference Stock, payable October 1st, 1912.....	\$1,333,901.94
And a fourth quarterly dividend on Ordinary Stock of 1½ per cent., payable October 1st, 1912	3,150,000.00
	\$4,483,901.94
Leaving net surplus for the year.....	\$17,560,518.87
In addition to the above dividends on Ordinary Stock three per cent. was paid from Special Income.	

THE FOLLOWING ARE THE DETAILS OF SPECIAL INCOME FOR YEAR ENDED JUNE 30TH, 1912.

Balance at June 30th, 1911.....	\$2,702,205.20
Interest on Cash Proceeds and on Deferred Payments for land sold	1,817,774.37
Interest on Deposits and Loans.....	605,140.21
Interest on Can. Pac. Ry. 1st Mortgage Bonds acquired.....	61,612.00
Interest from Minneapolis, St. Paul & Sault Ste. Marie Ry. Bonds	159,720.00
Interest from Duluth, South Shore & Atlantic Ry. Bonds.....	100,000.00
Interest from Mineral Range Ry. Bonds.....	50,160.00
Interest from Toronto, Hamilton & Buffalo Ry. Bonds.....	10,840.00
Interest from Kingston & Pembroke Ry. Bonds.....	13,320.00
Interest from Dominion Government Bonds.....	182,500.00
Interest from Ontario Government Bonds.....	48,000.00
Interest from British Consols.....	114,569.44
Interest from Montreal & Atlantic Ry. Bonds, and on other Securities	174,311.88
Dividend on St. John Bridge & Ry. Extension Co. Stock.....	50,000.00
Dividends on Dominion Express Co. Stock.....	160,000.00
Dividends on Minneapolis, St. Paul & S. S. M. Ry. Common Stock	890,645.00
Dividends on Minneapolis, St. Paul & S. S. M. Ry. Preferred Stock	445,326.00
Dividends on Alberta Ry. & Irrigation Company Stock.....	245,241.50
Dividend on West Kootenay Power & Light Co. Common Stock	27,500.00
Dividends on West Kootenay Power & Light Co. Preferred Stock	1,925.00
	\$7,860,790.60
Less—Payments to Shareholders in dividends:	
September 30th, 1911, January 2nd, 1912, April 1st, 1912, and June 29th, 1912.....	5,400,000.00
	\$2,460,790.60
From this a dividend has been declared, payable October 1st, 1912	1,350,000.00
Leaving net surplus carried forward.....	\$1,110,790.60

2. The working expenses for the year amounted to 64.89 per cent. of the gross earnings, and the net earnings to 35.11 per cent., as compared with 64.77 and 35.23 per cent., respectively, in 1911.

3. Four per cent. Consolidated Debenture Stock to the amount of £2,252,516 was created and sold, and of the proceeds the sum of £1,481,592 was applied to the construction of authorized branch lines; £300,000. was used for acquisition of Steamships for Pacific Coast Service, as authorized; £5,000 was used to acquire a like amount of your Company's First Mortgage 5% Bonds; and the balance £465,924 was devoted to the acquisition of the bonds of other railway companies whose lines constitute a portion of your System, the interest on which had, with your sanction, been guaranteed by your Company.

4. Four per cent. Preference Stock to the amount of £1,976,390 was created and sold, the proceeds being used to meet capital expenditures that had your previous sanction.

5. Your guarantee of interest was endorsed on Four per cent. Consolidated Bonds of the Minneapolis, St. Paul and Sault Ste. Marie Railway Company to the amount of \$1,520,000, issued and sold to cover the cost of 76 miles of railway added to that Company's railway system.

6. During the year 669,639 acres of agricultural land were sold for \$10,710,143.00, being an average of \$15.99 per acre. Included in this area there were 3,270 acres of irrigated land, which brought \$44.25 per acre, so that the average price of the balance was \$15.85 per acre.

7. Your Directors consider it desirable to extend the following branch lines of railway in Manitoba, Saskatchewan and Alberta, and will ask you to sanction the issue of the requisite amount of Four per cent. Consolidated Debenture Stock to meet the expenditures, viz.: Boissevain to Lauder—37 miles; Weyburn Lethbridge Branch—125 miles; Kerrobert Northeastern Branch—11 miles; Wilkie Anglia Branch—4 miles; Swift Current North-

westerly Branch—80 miles; Suffield Southwesterly Branch—55 miles. 8. There will be submitted for your consideration and approval a lease of the Kingston and Pembroke Railway, extending from Renfrew, on the Company's main line west to Ottawa, to Kingston, on the St. Lawrence River, and from the Village of Godfrey to Zanesville Mine, in the Province of Ontario, a total distance of 107.5 miles; a lease of the Alberta Central Railway, extending from Red Deer to Rocky Mountain House, in the Province of Alberta, a distance of 65 miles; an agreement with the St. Mary's and Western Ontario Railway Company cancelling existing arrangements and substituting a lease of their property for a period of 999 years at a rental equivalent to four per cent. per annum on bonds issued or to be issued by that company with your consent to an amount not exceeding \$25,000 per mile of their railway; and a deed of conveyance of the Cap de la Madeleine Railway, about 4 miles in length, connecting your Railway near Three Rivers, in the Province of Quebec, with Cap de la Madeleine, on the St. Lawrence River, and with the Wayagamack Pulp and Paper Company's works.

9. An indenture of lease from the Government of the Province of New Brunswick, as lessor, to this Company, as lessee, of the New Brunswick Coal and Railway for a term of 999 years at a rental of fifty per cent. of the net earnings of the said railway, as defined and calculated in the said proposed lease, will be submitted for your sanction. This railway extends from a point in the vicinity of Minto, in the County of Sunbury, to a point of junction with the Intercolonial Railway, near Norton, in the County of Kings, in the Province of New Brunswick, a distance of approximately 58 miles, and will form a portion of a connection between your Railway and a coal mine in the Province of New Brunswick, now in process of development.

10. For the purpose of securing a shorter and more expeditious route between Quebec and points in New England, served by your friendly connection the Boston and Maine Railroad, your Directors thought it advisable to lease the Quebec Central Railway, forming the connection between Sherbrooke and Levis, together with branch lines from Beauce Junction to St. Sabine, and from Tring to Megantic, all in the Province of Quebec, making a total of about 253.5 miles of railway, at a rental based upon the interest on the outstanding 1st, 2nd and 3rd Mortgage Bonds of the Quebec Central Railway Company, and a dividend on the outstanding Capital Stock of that company at four per cent. per annum for four years from July 1st, 1912, and thereafter at the rate of five per cent. per annum, and you will be asked to confirm the action of your Directors and sanction the agreement of lease between your Company and the Quebec Central Railway Company.

11. The Shuswap and Okanagan Railway, 51 miles in length, extending from Sicamous Junction, on your main line in British Columbia, to the head of Okanagan Lake, was leased to your Company on its completion in 1892 for a period of 25 years, and it was a condition of the lease that the Company should pay by way of rental forty per cent. of the gross earnings of the line, as defined in the lease, in quarterly amounts. The interest on the bonds issued by the Shuswap and Okanagan Railway Company for the construction of the line, amounting to £10,000 per annum, was unconditionally guaranteed by the Province of British Columbia. Until within the last two years the rental was insufficient to meet the annual interest charge, with the result that the Province of British Columbia had a deferred claim against the Shuswap and Okanagan Railway Company for the deficiency in interest amounting to about £80,000 at the end of last fiscal year. As the principal of the bonds will mature July 1st, 1915, and it is manifestly desirable that your Company should retain possession of the line, a lease of the property for a period of 999 years has been arranged and will be submitted for your approval. The rental to be paid by your Company is an amount equivalent to four per cent. per annum on the outstanding bonds of the company and on any that may hereafter be issued with your consent. Upon being subrogated in the rights of the Province your Company has undertaken to make good to the Province the deficiency in interest, to which reference has been made.

12. Your land in British Columbia secured by the construction of the Columbia and Western, and British Columbia Southern Railways had, by lapse of time and judgment of the Court, become subject to taxation. Of the lands in these grants 434,696 acres were sold during the past twelve years at an average net price of \$1.77 per acre. As these constituted the most accessible of the lands, and the remainder were so situated that they would necessarily be very slow of sale, your Directors decided after negotiations covering a considerable period to reconvey to the Government of the Province of British Columbia the unsold portion of these two land grants, excepting an area of 543,496 acres, reserved by the Company to meet its timber and tie requirements, at the price of 40 cents per acre. This will enable the Provincial authorities to encourage settlers to take up on very easy terms such of the lands as may be of use, and the Company will be relieved from the cost of administration and from the payment of rather heavy annual taxes. Your Directors are of opinion that the transaction, which was not completed until after the close of the fiscal year, will prove advantageous to both the Province of British Columbia and to your Company, and they hope that their action will meet with your approval.

13. The Georgian Bay and Seaboard Railway, recently built under the auspices of your company between Victoria Harbour, on Georgian Bay, and Bethany, Ontario, to provide a shorter and more economical lake and rail route between Western Canada and the Atlantic Seaboard, has proved more expensive than was anticipated, due to the character of the line that it was finally determined to construct and to other conditions. The power conferred by Parliament on the Georgian Bay and Seaboard Railway Company to issue bonds for the purposes of its undertaking was originally limited to \$30,000 per mile, but at the last Session of Parliament this amount was increased to \$55,000 per mile, and your Directors will ask your authority to enter into a supplementary agreement with the Georgian Bay and Seaboard Railway Company to increase the limit of that company's bond issue, upon which this Company has, by virtue of the lease approved October 3rd, 1906, agreed to pay interest by way of rental, from \$30,000 to an amount not exceeding \$55,000 per mile of railway.

14. Instead of continuing the double track from Glen Tay to Agincourt, on the Ontario and Quebec Railway between Montreal and Toronto, your Directors have decided, if you approve, to secure a line between these two points that will serve the territory further south, and will reach several important towns on the North Shore of Lake Ontario. An agreement has, therefore, been made with the Campbellford, Lake Ontario and Western Railway Company for the construction, under your Company's supervision and control, of that company's railway, 184 miles in length, between Glen Tay and Agincourt, both in the Province of Ontario, and for the lease of the railway when completed to your Company for a period of 999 years, at a rental equivalent to four per cent. per annum on the bonds of the Campbellford, Lake Ontario and Western Railway Company, issued with your consent.

15. Your present route between points in the Kootenay and Boundary Creek Districts, of British Columbia, and the Pacific Coast is long and expensive, and the best means of securing a more direct route has engaged the attention of your Directors for some time past. The Kettle Valley Railway Company, having a Dominion charter, covering the territory between Midway, the terminus of your Boundary Creek Line, and Merritt, on your Nicola Line, undertook to build the railway between these points, under the advice and to the satisfaction of your Directors, upon condition that your Company would lease the line, approximately 270 miles in length, and the branch line along the North Fork of the Kettle River, 24 miles in length, whenever and as soon as the Kettle Valley Railway Company is competent to make a lease, paying by way of rental the interest at four per cent. per annum on the bonds of the Kettle Valley Railway Company, issued with your consent, any subsidy received from the Dominion or Provincial Government, or from any other source, to be applied on an agreed basis towards the cost of the construction of the railway and a corresponding reduction in the amount of bonds to be issued. This line will give you access to a large and important section of the Province in which development should quickly follow railway facilities. Your Directors will suggest that they be clothed with power to make an agreement of lease when the requisite legal formalities have been complied with.

16. The amounts appropriated for new works, exclusive of railway construction, were abnormally large, in the year under review. For the enlargement of terminals, additional buildings, shops, second tracks, sidings and improvements of every variety calculated to improve the efficiency of your railway system, and to facilitate the movement of your large and increasing traffic, the amount of \$30,000,000 was authorized to be expended and orders for locomotives and cars, representing an expenditure of \$25,750,000, were placed. Many of these works cannot be completed within the season with the limited amount of labour available, but your Directors are sparing no effort to meet the convenience of the public and to strengthen your own position. Canadian manufacturers of freight cars are very much behind in their deliveries, but they promise to do better, and there is little doubt that all of the equipment ordered abroad will be forwarded according to contract.

17. In 1905, when your Company acquired the Esquimalt and Nanaimo Railway, you also purchased the unsold lands on Vancouver Island belonging

to that Company, about 1,400,000 acres in area, at the price of \$1,330,000. Thus far 250,000 acres have been sold, yielding \$3,364,000, and the remaining area is of great value, although some portions of it are so situated that they cannot well be utilized. There was the possibility that these lands might be subject to taxation if segregated from the Esquimalt and Nanaimo Railway, and, therefore, they have never been taken into your accounts, but an agreement about taxes has been made with the Government of the Province of British Columbia and hereafter the figures relating to them will appear in your annual statements.

18. At a Special General Meeting of the Shareholders held on May 11th, 1892, called for the purpose of giving effect to the Act of 1892, a Resolution was adopted authorizing the Company to create and issue from time to time Consolidated Debenture Stock payable in Sterling money of Great Britain and bearing interest not exceeding four per cent. per annum for the purpose of satisfying or acquiring Mortgage Bonds of any other railway company, the principal or interest of which the Company shall have already guaranteed. The Dominion Atlantic Railway Company, whose railway you have leased, provided its money requirements by an issue of three classes of Debenture Stock, upon which your Company has guaranteed the payment of the annual interest as a consideration for the lease of the property. It is quite likely that in the future it will be found desirable to acquire a portion, or all, of this Debenture Stock by an issue of your own Four per cent. Consolidated Debenture Stock, and in order to comply strictly with the provisions of the Act of 1892, it will be necessary to have an issue of Consolidated Debenture Stock for that purpose approved by the Shareholders at the Special General Meeting duly called for the purpose immediately after the Annual General Meeting.

19. The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election:

MR. WILMOT D. MATTHEWS,
SIR SANDFORD FLEMING, K.C.M.G.,
MR. ADAM R. CREELMAN, K.C.,
SIR WILLIAM WHYTE,

For the Directors,

T. G. SHAUGHNESSY,
President.

MONTREAL, August 12th, 1912.

CONDENSED BALANCE	
RAILWAY AND EQUIPMENT.....	\$382,829,051.33
OCEAN, LAKE AND RIVER STEAMSHIPS.....	21,338,974.12
ACQUIRED SECURITIES (COST):	
Exhibit "A"	80,525,353.32
PROPERTIES HELD IN TRUST FOR THE COMPANY	6,378,358.03
DEFERRED PAYMENTS ON LAND AND TOWN SITE	
SALES	41,468,821.88
ADVANCES TO LINES UNDER CONSTRUCTION.....	16,654,401.70
ADVANCES AND INVESTMENTS.....	12,360,997.99
MATERIAL AND SUPPLIES ON HAND.....	13,017,431.90
CURRENT ASSETS:	
Agents and Conductors Balances.....	\$4,805,132.07
Miscellaneous Accounts Receivable.....	5,023,469.41
TEMPORARILY INVESTED IN GOVERNMENT SECURITIES	9,828,601.48
CASH IN HAND	10,088,734.86
	33,628,819.03
	<hr/>
	\$628,119,545.64

SHEET, JUNE 30, 1912.	
CAPITAL STOCK	\$180,000,000.00
PAYMENTS ON SUBSCRIPTION TO NEW ISSUE	
CAPITAL STOCK (\$18,000,000.00)	16,806,621.00
FOUR PER CENT. PREFERENCE STOCK.....	66,695,097.03
FOUR PER CENT. CONSOLIDATED DEBENTURE STOCK	153,823,706.86
MORTGAGE BONDS:	
First Mortgage, 5 per cent.....	\$34,998,633.33
Algoma Branch, 1st Mortgage.....	3,650,000.00
	38,648,633.33
CURRENT LIABILITIES:	
Audited Vouchers	\$11,361,277.06
Pay Rolls	5,621,929.55
Net Traffic Balances	290,366.38
Miscellaneous Accounts Payable	6,271,762.30
	23,545,335.29
INTEREST ON FUNDED DEBT AND RENTAL OF LEASED LINES:	
Coupons due July 1st, 1912, and including	
Coupons overdue not presented.....	\$1,207,274.00
Accrued Fixed Charges	184,428.35
	1,391,702.35
EQUIPMENT OBLIGATIONS	1,040,000.00
EQUIPMENT REPLACEMENT FUND.....	2,103,993.54
STEAMSHIP REPLACEMENT FUND.....	5,721,852.37
APPROPRIATION FOR ADDITIONS AND IMPROVEMENTS	3,535,712.14
RESERVE FUND FOR CONTINGENCIES.....	4,382,617.80
LANDS AND TOWN SITES	
SALES	57,538,307.59
SURPLUS	72,885,966.34
	<hr/>
	\$628,119,545.64

I. G. OGDEN,
Vice-President.

AUDITORS' CERTIFICATE.

We have examined the Books and Records of the Canadian Pacific Railway Co. for the fiscal year ending June 30th, 1912, and having compared the annexed Balance Sheet and Income Account therewith, we certify that, in our opinion, the Balance Sheet is properly drawn up so as to show the true financial position of the Company at that date, and that the relative Income Account for the year is correct.

Montreal, August 9th, 1912.

PRICE, WATERHOUSE & CO.,
Chartered Accountants (England).

NOTE.—In addition to above assets, the Company owns 6,660,581 acres of land in Manitoba, Saskatchewan and Alberta (average sales past year \$15.99 per acre), and 4,395,948 acres in British Columbia.

FIXED CHARGES FOR THE YEAR ENDED JUNE 30TH, 1912.		
£7,191,500	1st Mortgage Bonds 5% due July 1st, 1915..	\$1,749,931.66
£ 200,000	St. Lawrence & Ottawa Ry. 4% 1st Mortgage Bonds	38,933.34
£2,544,000	Man. S. West. Colzn. Ry. 1st Mortgage 5% Bonds due June 1st, 1934.....	127,200.00
	Toronto, Grey & Bruce Ry. Rental.....	140,000.00
£4,007,381-15-5	Ontario & Quebec Ry. Debenture Stock 5%..	975,129.56
\$2,000,000	Ontario & Quebec Ry. Ordinary Stock 6%..	120,000.00
£1,330,000	Atlantic & North West. Ry. 1st Mortgage Bonds due January 1st, 1937.....	323,633.34
£ 750,000	Algoma Branch 5% 1st Mortgage Bonds, due July 1st, 1937.....	182,500.00
\$ 500,000	New Brunswick Southern Railway 1st Mortgage Bonds, 3%.....	15,000.00
\$ 500,000	Lindsay, Bobcaygeon & Pontypool Ry. 1st Mortgage Bonds, 4%.....	20,000.00
	Rental, Calgary & Edmonton Ry.....	218,357.60
	Rental, Farnham to Brigham Jct.....	1,400.00
	Rental, Mattawamkeag to Vanceboro.....	23,800.00
	Rental, New Brunswick Ry. System.....	372,829.74
	Rental, Terminals at Toronto.....	25,353.15
	Rental, Terminals at Hamilton.....	35,297.73
	Rental, Hamilton Jct. to Toronto.....	42,191.12
	Rental, St. Stephen & Milltown Ry.....	2,050.00
	Rental, St. Marys & Western Ontario Ry....	2,442.05
	Rental, Joliette & Brandon Ry.....	5,000.00
	Rental, Lachine Canal Branch.....	939.96
	Interest on Montreal & Western Ry.....	15,403.37
	Interest on Equipment Obligations.....	63,066.67

4% CONSOLIDATED DEBENTURE STOCK.		
£30,490,493	Interest from July 1st, 1911....	\$5,935,482.62
£ 996,530	Interest from Jan. 1st, 1912....	96,995.58
£ 120,588	Interest from July 1st, 1912....	
		\$6,032,478.20
	Less received from subsidy Northern Colonization Railway..	8,000.00
		6,024,478.20
		<hr/>
		\$10,524,937.49

RECEIPTS AND EXPENDITURES.

YEAR ENDED JUNE 30TH, 1912.

Cash in hand, June 30th, 1911..... \$34,371,550.98

Temporarily invested in Government Securities..... 10,088,734.86

RECEIPTS:

Surplus Revenue as per statement.....	\$32,752,754.13
Special Income as per statement.....	5,158,585.40
	37,911,339.53

LAND DEPARTMENT:		
Lands and Townsites:		
Net proceeds of sales.....	\$8,279,537.17	
Collection of Deferred Payments on previous year's sales	6,028,524.87	
		\$14,308,062.04
Less amounts remaining in Deferred Payments on year's sales.....	13,380,925.93	
		927,136.11

RECEIPTS (Continued):

BONUSES:	
1 Dominion Government Subsidy	
On Moosejaw Branch.....	\$78,432.00
" Selkirk Branch—Gimli Extension.....	30,176.00
CAPITAL STOCK:	
SUBSCRIPTION TO \$18,000,000 ADDITIONAL ORDINARY STOCK:	
Payments on instalments	16,806,621.00
FOUR PER CENT. PREFERENCE STOCK:	
Amount realized from issue £1,976,390.....	9,444,080.19
CONSOLIDATED DEBENTURE STOCK:	
Amount realized from issue £2,252,516.....	11,016,661.59
DEDUCT:	
Advances to Lines under Construction.....	\$16,654,401.70
Advances and Investments.....	12,360,997.99
Current Assets	9,828,601.48
	\$38,844,001.17
Less amount at June 30th, 1911.....	26,684,005.17
EXPENDITURES:	
Dividends on Preference Stock:	
2 per cent. paid September 30th, 1911.....	\$1,141,533.31
2 per cent. paid April 1st, 1912.....	1,258,333.32
Dividends on Ordinary Stock:	
2½ per cent. paid September 30th, 1911.....	\$4,500,000.00
2½ per cent. paid January 2nd, 1912.....	4,500,000.00
2½ per cent. paid April 1st, 1912.....	4,500,000.00
2½ per cent. paid June 29th, 1912.....	4,500,000.00
Properties held in trust for the Company.....	
Construction of acquired and branch lines, Exhibit "D".....	
Additions and Improvements, main line and branches, Exhibit "E"	
Additions and Improvements, leased and acquired lines, Exhibit "F"	
Rolling Stock, Shops and Machinery.....	
Ogden Shops at Calgary.....	
Ocean, Lake and River Steamships:	
Additional Steamships and Appurtenances for Pacific Coast Service.....	\$749,894.19
Less sale of Steamship "Amur".....	11,000.00
Additional River Steamers and Barges.....	
Extension to Steamship "Alberta".....	86,740.83
Payments on account of Steamships "Empress of Asia" and "Empress of Russia".....	1,819.44
Less amount paid from Steamship Replacement	1,557,671.94
	\$778,835.97
Additional Facilities at Liverpool.....	62,260.15
SECURITIES ACQUIRED:	
Calgary & Edmonton Ry. 1st Mortgage Bonds.....	\$2,200,000.00
Kingston & Pembroke Ry. 1st Mortgage Bonds.....	254,637.50
Shuswap & Okanagan Ry. 1st Mortgage Bonds.....	4,767.07
Tilsonburg, Lake Erie & Pacific Ry. 1st Mortgage Bonds.....	67,500.00
Alberta Ry. & Irrigation Co. Stock.....	125,550.00
Dominion Atlantic Ry. Stock.....	10,183.06
Kingston & Pembroke Ry. Stock.....	1,099.25
Shuswap & Okanagan Ry. Stock.....	39,550.00
West Kootenay Power & Light Co. Stock.....	517,493.25
Minneapolis, St. Paul & Sault Ste. Marie Ry.: Balance of Subscription to Ordinary and Preferred Stock	1,324,920.00
Payment of Equipment Obligations.....	4,545,700.13
Increase in Material and Supplies on hand.....	160,000.00
	1,826,177.89
DEDUCT:	
Increase in current liabilities.....	6,797,596.57
Temporarily Invested in Government Securities.....	\$64,797,182.37
Cash on hand	10,088,734.86
	33,628,819.03
	\$108,514,736.26

STATEMENT OF EARNINGS FOR THE YEAR ENDED JUNE 30TH, 1912.

From Passengers	\$31,812,207.82
" Freight	79,833,734.03
" Mails	859,557.54
" Sleeping Cars, Express, Telegraph and Miscellaneous	10,814,041.84
Total	\$123,319,541.23

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED JUNE 30TH, 1912.

Transportation Expenses	\$38,923,050.02
Maintenance of Way and Structures.....	17,719,795.21
Maintenance of Equipment.....	13,608,708.19
Traffic Expenses	2,880,800.32
Parlor and Sleeping Car Expenses.....	944,594.34
Expenses of Lake and River Steamers.....	1,064,011.53
General Expenses	3,444,394.51
Commercial Telegraph	1,435,944.28
Total	\$80,021,298.40

STATEMENT OF SURPLUS INCOME ACCOUNT, JUNE 30TH, 1912.

Balance at June 30th, 1911.....	\$55,374,493.44
Net earnings of Railway and Steamship Lines.....	\$32,752,754.13
Special Income	5,158,585.40
(as per statements)	
	37,911,339.53
	\$93,285,832.97

Less: Dividends on Preference Stock, paid September 30th, 1911, and April 1st, 1912.....	\$2,399,866.63
And dividends on Ordinary Stock, paid September 30th, 1911, January 2nd, 1912, April 1st, 1912, and June 29th, 1912.....	18,000,000.00
	20,399,866.63
Total Surplus Income, June 30th, 1912.....	\$72,885,966.34
From this there have been declared the dividends on Preference and Ordinary Stock, payable October 1st, 1912, amounting to	
	\$5,833,901.94

APPROPRIATIONS FOR ADDITIONS AND IMPROVEMENTS.	
Balance at June 30th, 1911.....	\$7,119,285.64
Less: Expended during year included in Exhibits E and F.....	3,583,573.50
Amount unexpended	\$3,535,712.14

STATEMENT OF EQUIPMENT AT 30TH JUNE, 1912.

Locomotives	1,820
*First and second class Passenger Cars, Baggage Cars and Colonist	
Sleeping Cars	1,841
First class Sleeping, Dining and Café Cars	369
Parlor Cars, Official and Paymasters' Cars	75
Freight and Cattle Cars (all kinds)	61,446
Conductors' Vans	1,065
Boarding, Tool and Auxiliary Cars and Steam Shovels	4,254
* Includes cars in Line Service as follows:	

ST. JOHN AND BOSTON LINE. MONTREAL AND BOSTON LINE.

2 First Class	1,731,691
2 First Class & Smoking	
2 Dining and Smoking	68.33% owned by other lines.
4 Second Class	
4 Baggage	other lines.
4 2nd Class	
4 Baggage & Express	

14 Cars TORONTO, HAMILTON AND BUFFALO LINE.	
6 First Class	
3 Second Class	
2 Baggage and Smoking	63.96% owned by other lines.
3 Baggage and Express	

14 Cars DESCRIPTION OF FREIGHT FORWARDED.

YEAR ENDED JUNE 30TH		
Flour	Barrels	1910. 1911. 1912.
Grain	Bushels	111,169,982 151,731,691
Live Stock	Head	1,381,183 1,567,665
Lumber	Feet	2,292,821,963 2,441,007,107 2,806,735,006
Firewood	Cords	280,878 298,345
Manufactured Articles	Tons	5,468,548 5,759,344
All other articles	Tons	7,567,052 8,971,037

FREIGHT TRAFFIC.

YEAR ENDED JUNE 30TH		
Number of tons carried	1910.	1911. 1912.
Number of tons carried one mile	20,551,368	22,536,214 25,940,238
Earnings per ton per mile	7,772,012,635	8,062,102,013 10,391,650,965
0.77 cts. 0.81 cts. 0.77 cts.		

PASSENGER TRAFFIC.

YEAR ENDED JUNE 30TH		
Number of passengers carried	1910.	1911. 1912.
Number of passengers carried one mile	1,355,266,088	1,457,332,932 1,626,577,067
Earnings per passenger per mile	1.83 cts.	1.93 cts. 1.96 cts.

TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED JUNE 30TH, 1912 AND 1911.

EARNINGS OF LAKE AND RIVER STEAMERS NOT INCLUDED IN THIS STATEMENT.

			Increase or Decrease.
TRAIN MILEAGE.	Year ended June 30th, 1912.	Year ended June 30th, 1911.	
Passenger trains	19,591,027	17,393,532	2,197,495 12.63
Freight "	25,638,692	21,701,893	3,936,799 18.14
Mixed "	1,727,792	1,680,421	47,371 2.82
Total trains	46,957,511	40,775,846	6,181,665 15.16

CAR MILEAGE.

PASSENGER.		
Coaches and P. D. and S. cars	100,088,130	89,404,332
Combination cars	2,917,523	2,812,227
Baggage, Mail and Express cars	42,678,970	38,487,654
Total Passenger cars.	145,684,623	130,704,213

FREIGHT.		
Loaded	556,244,798	460,739,921
Empty	140,210,180	139,455,186
Caboose	27,871,524	23,521,772
Total Freight cars.	724,326,502	623,716,879

Passenger cars per Traffic Train Mile	6.83	6.85
Freight cars per Traffic Train Mile	26.47	26.67

	.02	.29
	.754,994	.54

	18.49
	4,349,752